LCD TELEVISION

SERVICE MANUAL

Chassis LS07

Please read this manual carefully before service.

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Part Ⅰ: Specification , feature and Composition

Ⅰ、 Technical Specification:

20 inch LCD TV

Physical resolution :640*480(VGA), Audio power output:2*2.0W, Inside power module AC input voltage:AC 100～240V,50/60Hz.

Ⅱ、 Main feature

1、Radio frequency input

It can receive CATV signal.

2、AV input

Convenient for watching a DVD player,VCR,pickup camera or other playback devices.

3、S-video input

Convenient of receiving a high quality component signal from a DVD player.

4、YPbPr input

Capable of receiving the high definition YPbPr signal in 480i,480P,576i,576P,720P（50/60HZ）,1080i（50/60HZ）,and 1080P（50/60HZ） formats.

5、Scart input

6、VGA input

a. Convenient to connect with a host computer.

b. Use as a data display terminal.

c. Connect the 3.5mm(diameter)audio jack to your computer's soundcard to listen to stereo sound transmitted from your home computer.

7、Program & child lock function

Capable of locking any program of the TV and the function button of the front panel.

8、Timer function

9、Blue background with noise reduction

In AV、S-video and YPbPr modes, screen displays soft blue background if there is no signal input.

10、 Multi Language on-screen display menu

Text and graphical user interface makes the menu operation user-friendly.

11、 Power energy Saving mode(power management mode)

When used as PC display terminal without PC signal output, the LCD TV will automatically power off within 30 Seconds and enter Power Energy Saving Mode. It will automatically startup again when it receives a signal from the PC.To start the TV manually with no signal press the number buttons or【⏻】/【P+】/【P-】 on the remote control.

12、Plug-and-play

No additional software is needed when the product is used as computer

terminal display.

13、Automatic picture's quality adjustment

14、No flicker, no radiation, greenness and health

15、Auto on as time is set

16、Zoom mode

Full-screen 、16:9、cinema、Subtitle

17、Legerity, convenient, low power consumption

18、Picture quality enhancement function

Dynamic skin color correct: improve distort color in picture, make it near to real color.

Black level extension: darken the large part of black section to enhance pictures contrast in the dim background

Color edge adjustment: increase the steep of color signal edge, make the edge of color transition more clearly.

Brightness edge adjustment: increase edge gradient of brightness signal, make the edge of picture more clearer

19、Super definition display panel

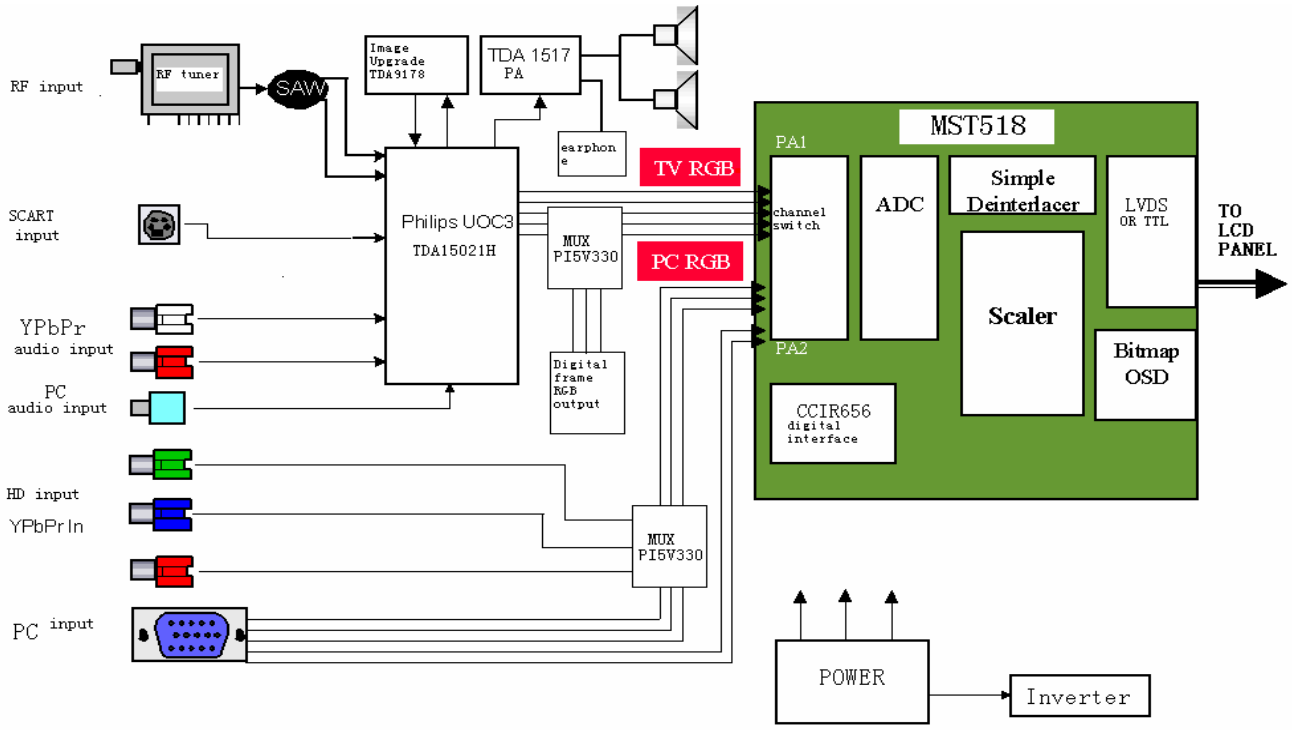
20、Dynamic comb filter

21、Headphones output

22、10 page teletext

Ⅲ. Circuit composition of the TV

The American LS07 chassis LCD TV is composed of regulating voltage circuit、inverter Circuit 、RF circuit、video enhancement circuit、video Processing circuit、Power amplifier circuit、VGA circuit、system control circuit and key control circuit. The block diagram of circuit composition is below:



Ⅳ. PCB assembly introduction

The Constitution of the PCB is easier than LP03 chassis, all the Signal Processing are in Main board.

1、 Main board assembly

Main board Module is the main part of Signal Processing in LCD TV. The input signal is converted into uniform digital signal which can be identified by TFT under the control of system control circuit. Main board module contains two parts of signal processing module: Philips UOC3 process analog audio and video circuit mainly, MST518 process VGA circuit、signal format transform system control circuit mainly. The front module can convert the video IF signal and audio IF signal from tuner into RGB analog signal and audio signal, this part is named analog audio and video decoding process. The RGB color from UOC is received by MST518, then MST518 accomplish A/D converting , output suitable digital color signal to Drive circuit of TFT . 8051 Processor inside UOC is responsible for co-operation work of the each part of system, and respond to user operation which is operated on control panel(key board Module).

2、 Key board assembly

It is composed of 7 function keys. the user can operate the LCD TV conveniently by using this assembly.

3、 Remote control receiving board assembly

It is composed of a work indicator light and a remote receive head. The user use the remote control box by this module can operate the LCD TV conveniently and know the LCD TV work condition.

4、 Earphone output board assembly

It is composed of a earphone outlet, user can Listen by earphone conveniently.

5、 Inverter board assembly(include inverter circuit)

The function of the inverter is supply power to light tube in TFT , and lighten the back lamp Unit of TFT module, so the user can see the image on TFT.

PartⅡ: Function introduction about the main integrated circuit

Ⅰ. Main ICs and components

serial number	Name	model	Main function
1	A1	TAF5-E2I21RW2	RF tuner
2	U8、U21	TDA1517ATW	Audio power amplifier
3	U3	MST518	AD converter and format transformer
4	U2	UOC(TDA15021H)	Video decode and MCU control
	U7	TDA9178	Analog signal processor
5	Q9	Si2311DS	MOS switch
6	U11、U12	IRF7316	MOS switch
7	U19	NTMS10P02R2	MOS switch
8	U9、U23	LM2596-5.0	Liner voltage IC
9	U1	24LC21A	EEPROM(save display parameter information)
10	U4	24LC32A	EEPROM（save user control information）
11	U6、U20	PI5V330A	Video switch

Ⅱ. The function introduction of main IC

1 MST518 high integration chip

MST518 is a high performance、high integration image processor which is designed for LCD, it can support SXGA format(1280*1024).it integrates a group of AD converter 、high quality format transform system、OSD generator、output clock generator、multiple format output display interface(support TTL、LVDS、RSDS)

MST518 feature:

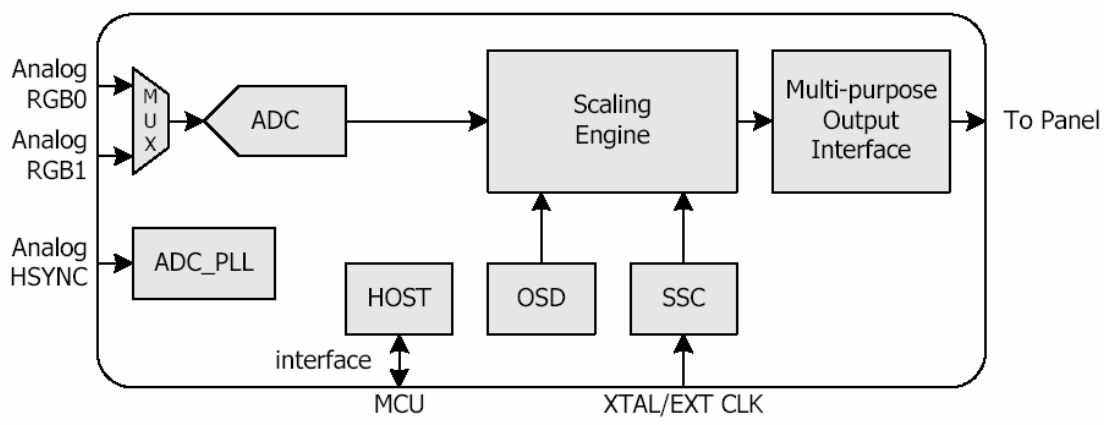
- Have high quality Expand transform and compress transform, can output XGA format signal
- Integrated LVDS circuit inside
- 8 bit high quality ADC inside
- Double VGA input, Software switch
- Support ITU-656 format signal input
- Support H/V sync、composite sync、green composite sync input, and detect automatically by itself
- Programmable 10 bit Gamma correct, the brightness and contrast is adjustable
- 8 color、256 Character OSD
- Built-in DDC circuit inside
- Low standby power
- Support TTL、double LVDS signal output, Software switch

MST518 pin function:

And CPU interface		
Pin	Pin name	Pin function
33	HWRESET	Hardware reset，high voltage enable
82	CS	Chip select signal of three-wire serial bus
83	SDA	data signal of three-wire serial bus
84	SCL	clock signal of three-wire serial bus
85	INT	interrupt
98-91	AD [7:0]	Parallel bus，the chassis is not used
125	BUSTYPE	Bus type select
Analog Interface		
38	HSYNC0	Analog Horizontal sync signal input channel 0
39	VSYNC0	Analog vertical sync signal input channel 0
40	HSYNC1	Analog Horizontal sync signal input channel 1
41	VSYNC1	Analog vertical sync signal input channel 1
78	RMID	Scaler internal reference. voltage
79	REFP	internal ADC decouple ＋
80	REFM	internal ADC decouple －
75	RIN0	Analog red signal input channel 0
74	RIN0M	Analog red signal input channel 0 reference grounding voltage
73	SOGIN0	Green sync signal input channel 0
72	GIN0	Analog green signal input channel 0
71	GIN0M	Analog green signal input channel 0 reference grounding voltage
70	BIN0	Analog blue signal input channel 0
69	BIN0M	Analog blue signal input channel 0 reference grounding voltage
66	RIN1M	Analog red signal input channel 1 reference grounding voltage
65	RIN1	Analog red signal input channel 1
64	GIN1M	Analog green signal input channel 1 reference grounding voltage
63	GIN1	Analog green signal input channel 1
62	SOGIN1	Green sync signal input channel 1
61	BIN1M	Analog blue signal input channel 1 reference grounding voltage
60	BIN1	Analog blue signal input channel 1
55	REXT	Outside connect 390Ω with 3.3V
LCD Interface		
145	OCLK	Clock output
146	LDE	enable signal
144	LVSYNC	vertical sync output

143	LHSYNC	Horizontal sync output
138	LVA0M	LVDS output 0－
137	LVA0P	LVDS output 0+
136	LVA1M	LVDS output 1－
135	LVA1P	LVDS output 1+
134	LVA2M	LVDS output 2－
133	LVA2P	LVDS output 2+
128	LVA3M	LVDS output 3－
127	LVA3P	LVDS output 3+
132	LVACKM	LVDS clock signal output－
131	LVACKP	LVDS clock signal output +
26-23,18-15	RB[7:0]	TTL red signal channel
14-11, 8-5	GB[7:0]	TTL green signal channel
4,3,154,153,150-147	BB[7:0]	TTL blue signal channel
GPIO Interface		
87	GOUT1/PWM1	PWM output 1
86	GOUT0/PWM0	PWM output 0
2	BYPASS	Outside connect filter capacitor
29	DDC_DAT	Analog interface DDC data
30	DDC_CLK	Analog interface DDC clock
31	DDCROM_CLK	DDC ROM clock
32	DDCROM_DAT	DDC ROM data
34	XIN	Crystal oscillator signal input
35	XOUT	Crystal oscillator signal output
Power Pins		
48, 54, 58, 77	AVDD	A/D convert power supply
56	AVDD_PLL	PLL power supply
36	AVDD_MPLL	MPLL power supply
10, 22, 88, 99, 111, 129, 139, 151	VDDP	Digital signal output power supply
19, 102, 114, 142	VDDC	Digital circuit power supply
1, 9, 20, 21, 37, 42, 45, 51, 57, 59, 76, 81, 89, 100, 101, 112, 113, 130, 140, 141, 152	GND	Digital circuit ground

MST518 inner diagram：



2 TDA15021H introduction:

The third-generation super integrated circuit UOC III which designed by Philips company recently integrates with video decode、2D comb filter、high quality audio process technique, suitable with US closed caption and V-chip function, compatible with single series IC. The series of UOC III have high integrity, besides completing the Processing of all small signal(IF signal demodulation, video decode ,H/V signal, sound DSP),and integrate all the MCU function. It has many Advantages ,example: the compact circuit、good performance、simple craft , etc. it matches with company's demand of high performance price ratio and high product efficiency . It is suitable for 4:3 or 16:9、50/60HZ and 100/120HZ TV system, the main characteristic is below:

- multi-system IF demodulation、analog video decode
- comb filter internal
- NICAM、stereo auto identify and decode
- support 4:3、16:9 display format
- 4 CVBS or 3 Y/C input,1 CVBS output,2 YCrCb/2 RGB input
- 4 AV audio input,1 AV adjustable audio volume output
- volume auto level control circuit
- global FM demodulation
- picture quality enhancement of dynamic peak value control、skin color correct、Gamma correct、Black level extension, etc
- Can turn off horizon and vertical scan part，output H/V sync. signal to Scaler
- 128K Flash Memory inside, support program on line
- Automatic Y/C signal identify

TDA15011H pin function:

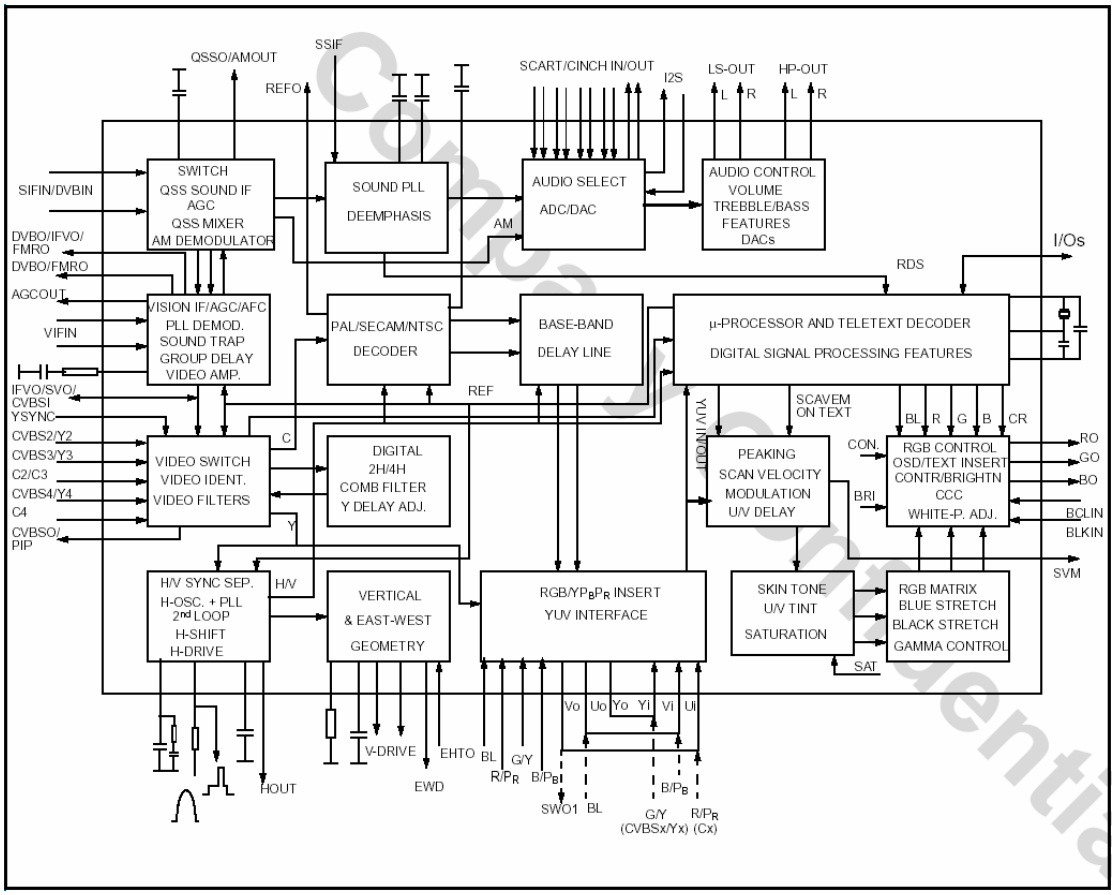
pin	Pin name	Pin function
1	VSSP2	Grounding
2	VSSC4	Grounding
3	VDDC4	+1.8V

4	VDDA3	+3.3V
5	VREF_POS_LSL	+3.3V
6	VREF_NEG_LSL+HPL	0V
7	VREF_POS_LSR+HPR	+3.3V
8	VREF_NEG_HPL+HPR	0V
9	VREF_POS_HPR	+3.3V
10	XTALIN	crystal oscillator input
11	XTALOUT	crystal oscillator output
12	VSSA1	Grounding
13	VGUARD/SWIO	Protecting voltage input or I/O
14	DECDIG	DECDIG signal input
15	VP1	+5V
16	PH2LF	The second grade horizontal phase lock filter
17	PH1LF	The first grade horizontal phase lock filter
18	GND1	Grounding
19	SECPLL	SECAM PLL decouple
20	DECBG	Inside reference voltage decouple
21	EWD/AVL	VDD5A voltage input
22	VDRB	TV vertical sync signal output
23	VDRA	vertical sync output
24	VIFIN1	VIF input 1
25	VIFIN2	VIF input 2
26	VSC	Outside connect vertical ramp capacity
27	IREF	Reference current input
28	GNDIF	IF grounding
29	SIFIN1	SIF input 1
30	SIFIN2	SIF input 2
31	AGCOUT	tuner RF AGC control voltage output
32	EHTO	overvoltage protection input
33	SSIF	MUTE control signal input
34	AUDIOIN5L	Av left track signal input
35	AUDIOIN5R	Av right track signal input
36	AUDOUTSL	SCART/CINCH left track output
37	AUDOUTSR	SCART/CINCH right track output
38	DECSDEM	Track demodulator decouple
39	QSSO	Deemphasis capacitor
40	GND2	grounding
41	PLLIF	IF_PLL filter
42	SIFAGC	Sound intermediate frequency auto gain control
43	IFVO	IF demodulation video output
44	FMRO	FM broadcast output
45	VCC8V	The supply voltage of Sound switch
46	AGC2SIF	The second sound intermediate frequency auto gain

		control
47	VP2	+5V
48	IFVO	The video output of Choose channel
49	AUDIOIN4L	HD signal left track audio output
50	AUDIOIN4R	HD signal right track audio output
51	CVBS4/Y4	S-video luminance signal input
52	C4	S-video chroma signal input
53	AUDIOIN2L	PC signal left track audio input
54	AUDIOIN2R	PC signal right track audio input
55	CVBS2/Y2	AV CVBS signal input
56	AUDIOIN3L	Inside DVD module left track audio input
57	AUDIOIN3R	Inside DVD module right track audio input
58	CVBS3/Y3	Inside DVD module brightness signal input
59	C2/C3	Inside DVD module chroma signal input
60	AUDOUTLSL	Main channel left track output
61	AUDOUTLSR	Main channel right track output
62	AUDOUTHPL	Earphone channel left track output
63	AUDOUTHPR	Earphone channel right track output
64	CVBS/PIP	CVBS/PIP output
65	SVM	Scan modulate output
66	FBISO	flyback input/sandcastle output or composite H/V timing output
67	HOUT	Horizontal sync signal output
68	VSScomb	Grounding
69	VDDcomb	+5V
70	VIN	V signal input
71	UIN	U signal input
72	YIN	Y signal input
73	YSYNC	Y signal input for Sync separate
74	YOUT	Y signal output
75	UOUT	U signal output
76	VOUT	V signal output
77	INSSW3	RGB/YpbPr insert identify signal input
78	R/PrIN3	R/Pr signal input
79	G/YIN3	G/Y signal input
80	B/PbIN3	B/Pb signal input
81	GND3	grounding
82	VP3	+5V
83	BCLIN	beam current limiter input
84	BLKIN	Black current input
85	RO	R basic color signal input
86	GO	G basic color signal output
87	BO	B basic color signal output

88	VDD3	+3.3V
89	VREFAD_NEG	0V
90	VREFAD_POS	+3.3V
91	VREFAD	Audio ADC reference voltage
92	GNDA	grounding
93	VDDA	+1.8V
94	VDD3A	+3.3V
95	VSSADC	grounding
96	VADC	+1.8V
97	INT0	Remote control signal input
98	P10/INT1	DPF clock line
99	P11/T0	DPF data line
100	VDDC2	+1.8V
101	VSSC2	grounding
102	P04/12SWS	MST reset signal
103	P03/12SCLK	HD_PC select control signal
104	P02/12SDO2	Power Amplifier standby control signal
105	P01/12SDO1	TV_DPF select control signal
106	P00/12SDII/O	Turn on control signal
107	P13/T1	MST chip select signal
108	P16/SCL	UOCI2C bus clock line
109	P17/SDA	UOCI2C bus data line
110	VDDP	+3.3V
111	P20/TPWM	Red indicator light control signal
112	P21/PWM0	green indicator light control signal
113	P22/PWM1	TFT power supply control signal
114	P23/PWM2	Inside DVD module power supply control signal
115	P30/ADC0	Reserve IO port
116	P31/ADC1	Earphone insert identify signal input
117	VDDC1	+1.8V
118	VDD18	+1.8V
119	P32/ADC2	DVD key-press signal input
120	P33/ADC3	TV key-press signal input
121	VSSC	grounding
122	P24/PWM3	Background control signal output
123	P25/PWM4	SAW filter control signal
124	VDDC3	+1.8V
125	VSSC3	grounding
126	P12/INT2	MST interrupt signal input
127	P14/RX	MST data line
128	P15/TX	MST clock line

TDA15021H inside block diagram



3、TDA9178 brief

TDA9178 is a analog signal processor with standard YUV input and output interface .It provide three main process function: luminance vector, color vector and spectrum process. It can finish comprehensive picture improving function independently. The characteristic of the TDA9178 is below:

a) Luminance Transient Improvement (LTI), Color Transient Improvement (CTI)
b) Variable gamma control
c) Self-suitable black level extention control
d) Skin color correction, green intensity ,blue extend
e) Noise measurement and reduced noise processing function
f) Line Width Control (LWC)

TDA9178 PIN DESCRIPTION:

Pin	Pin name	Function
1	sandcastle input	sandcastle input
2	not connected	Grounding
3	ADC input 1	A/D convertor input 1
4	ADC input 2	A/D convertor input 2
5	ADC input 3	A/D convertor input 3
6	luminance input	Y input

7	address selection input	I2C address choose input terminal
8	U signal input	U input
9	V signal input	V input
10	test pin	Grounding
11	serial clock input (I2C-bus)	I2C bus clock signal
12	not connected	Not connected
13	not connected	Not connected
14	serial data input/output (I2C-bus)	I2C bus data signal
15	decoupling digital supply	connect decouple capacitor external
16	V signal output	V signal output
17	U signal output	U signal output
18	ground	Ground
19	luminance output	Y signal input
20	supply voltage	Supply power
21	SCAVEM output	Scan velocity modulate output
23	not connected	Grounding
24	not connected	Grounding

TDA9178 inside block diagram:

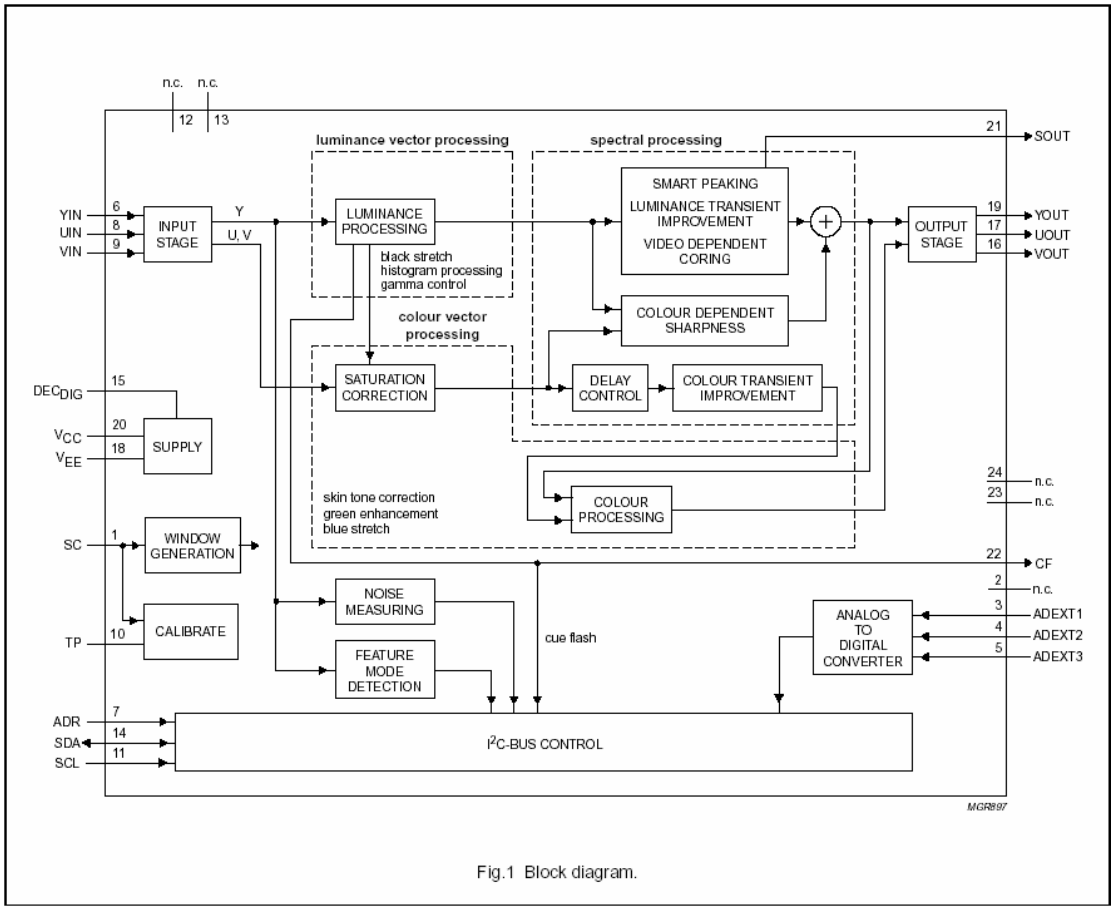


Fig.1 Block diagram.

4、TDA1517ATW brief:

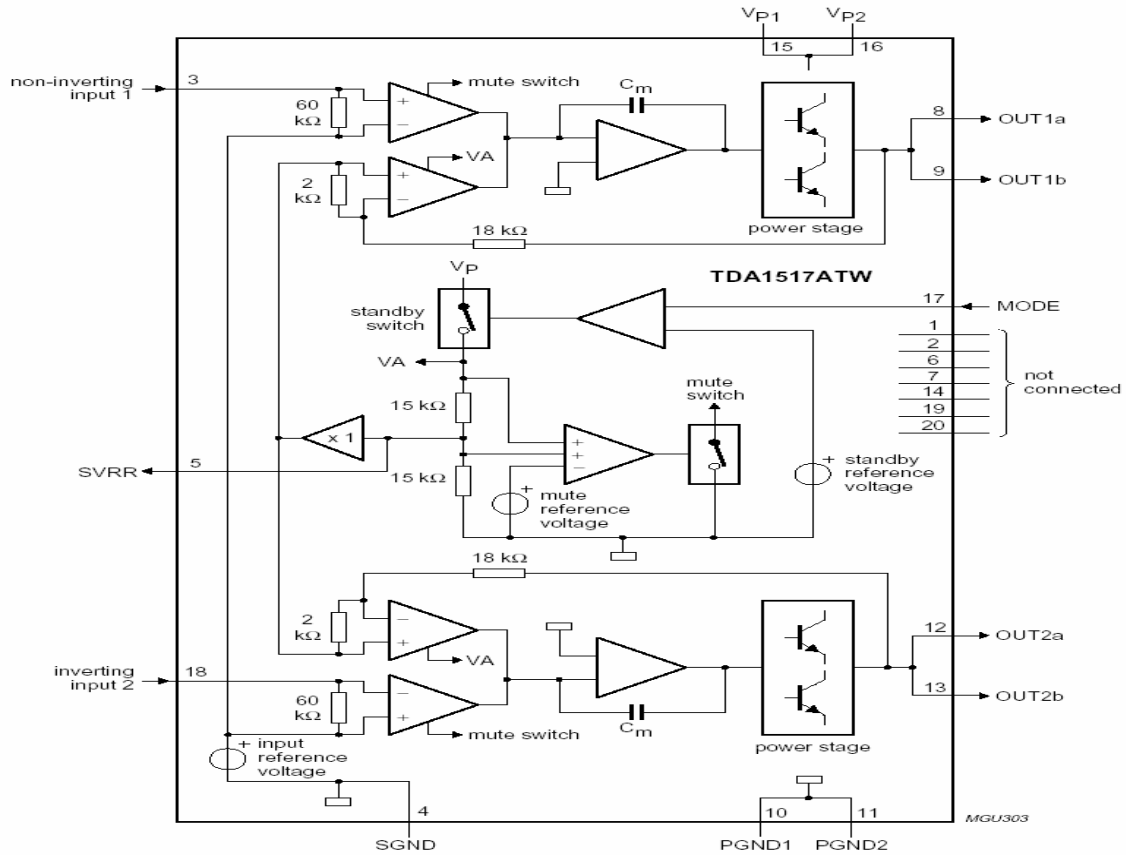
The TDA1517ATW is an double channel class-AB power amplifier contained in a plastic heat sink thin shrink small outline package (HTSSOP20). The device is primarily developed for multimedia applications.

a) Outside circuit is simple
b) Mute、standby is controllable
c) Temperature protect circuit
d) low noise switch
e) Constant gain

TDA1517 PIN DESCRIPTION:

Pin	Pin name	function
3	non-inverting input	Audio input
5	supply voltage ripple rejection	Bias circuit filter
8、9	Output	Audio output
12、13	N.C.	Not connected
15、16	supply voltage	＋12V power supply
17	mode select switch	Work mode select
18	inverting input	Reverse input terminal （connect capacitor to ground ）
1、2、4、6、7、10、11、14、19、20	GND	ground

TDA1517 inside block diagram:



PartⅢ: Signal Processing Flow chart

This chapter mainly introduces analog signals process、video intensify process、TV system control process、TV supply system.

Ⅰ. analog signals process

1、 IF/RF process

Completed by TAF5-E2I21RW2 RF tuner, output IF signal.

The Function of RF tuner is below:

Pin	symbol	function
1	AGC	Auto gain control voltage
2	TU	The TV do not connect
3	ADD	ground
4	SCL	I^2C bus（clock ）
5	SDA	I^2C bus（data ）
6	BM	+5V power supply
7	BM	+5V power supply
8	NC	Not connected
9	BTL	+32V power supply，form 0～32V tune voltage
10	NC	Not connected
11	IF	IF signal output

2、 Image and sound process

UOC chip receives the IF signal separated from SAW filter, detects and decodes. Output RGB color analog signals from the 85、86、87 pin respectively. Output the main channel L、R audio signal from 60、61 pin. Output earphone channel L、R audio signal from 62、63 pin.

Moreover, AV、S-Video、YC signal of inside DVD(some types of TV have not) is also decoded inside of UOC chip, switched with TV input in UOC and output one way RGB color analog signal, send it to back-end process.

3、 Digital signal process

The analog RGB signal output from UOC and RGB signal output from DFP are switched and selected by a PI5V330A, input it into the 65、63、60 pin Of MST518. The RGB signal output from computer and HD-YPbPr signal are switched and selected by another PI5V330A, input into the 75、72、70 of MST518. This two channel RGB signal are switched inside MST518, then AD conversion, video format transition, at last output digital color signal which is suitable for TFT drive circuit. MST518 finishes the pixels ratio converting of input video signal、the image auto optimization process , then process via memory buffer、scaler、chroma matrix circuit、chroma look-up table、chroma space gain, etc. Output corresponding standard physical resolution digital color signal and corresponding sync, clock signal to TFT, control the TFT to display image correctly.

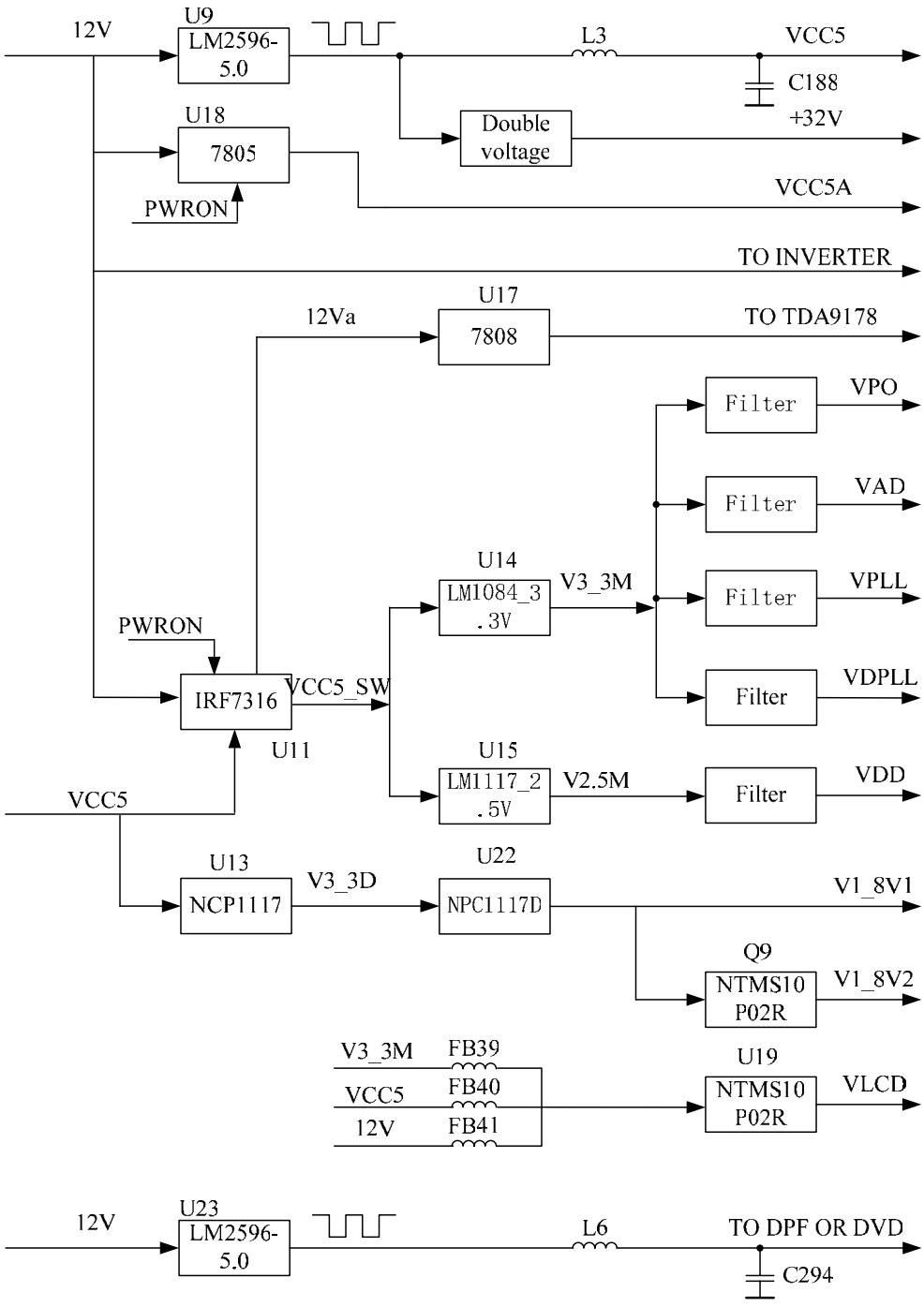
4、TV power supply system:

(1) The supply power system of the main IC is below:

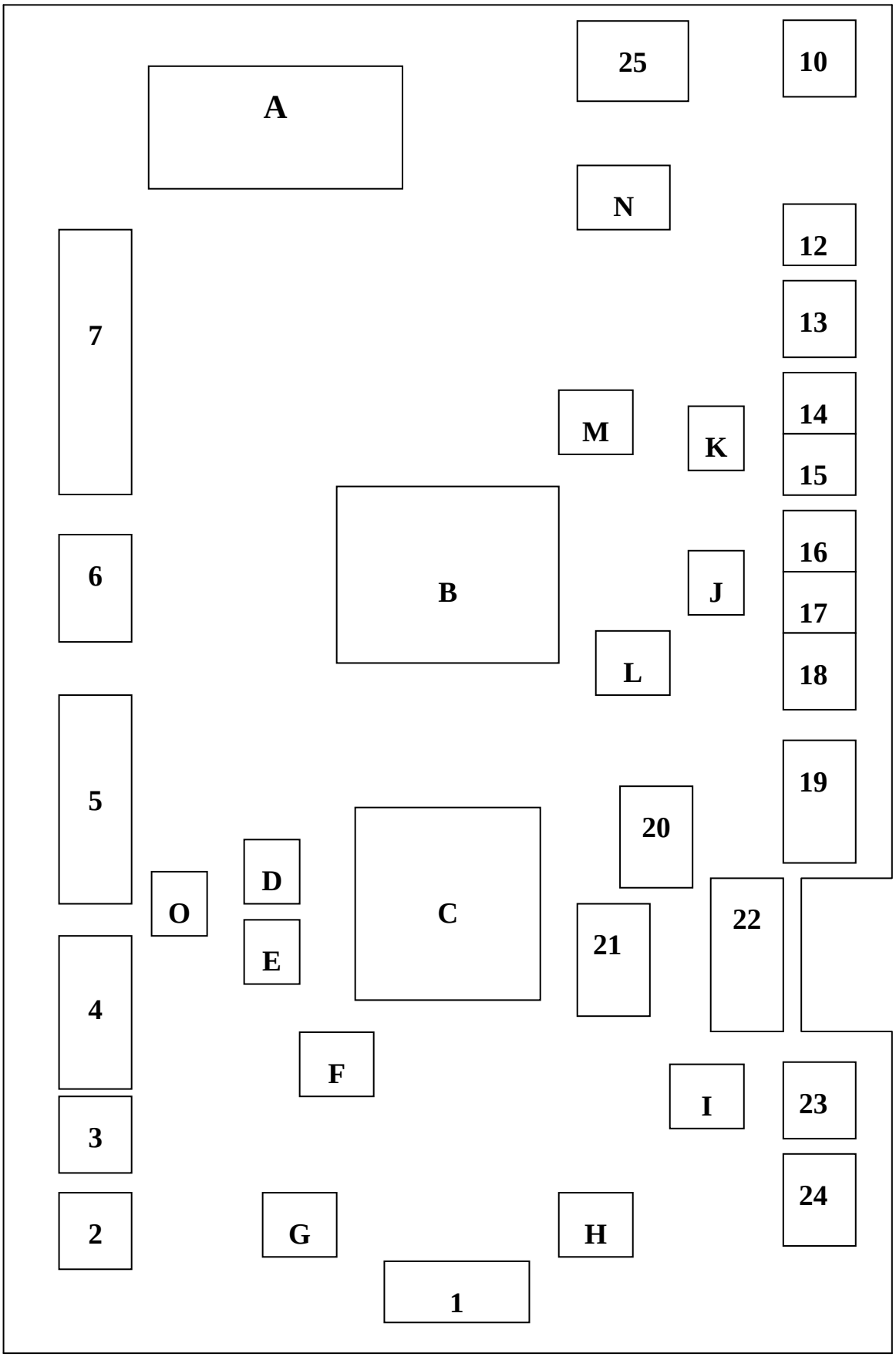
- 12V:the unit main power supply

- +34V:RF tuner tune voltage
- VCC5: stable and constant +5V power supply
- VCC5A: +5V power supply software can turn off
- V3_3D:UOC digital part supply power supply
- V1_8V1:UOC digital part constant supply power supply
- V1_8V2:UOC digital part power supply can be turned off
- V2_5M:MST518 digital core supply power supply
- V3_3M:MST518 supply power supply

(2) The constitution and distributing of the TV



5、The location of main components and socket on mainboard and definition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Socket definition

number	name	Connect object	Function description
1	JP1	Connect inside power supply board module	
2	JP2	Connect outside power adapter	Not used
3	J8	Connect outside VGA audio input	
4	J1	Connect outside VGA input	
5	J3	Connect outside HD-YPbPr input	
6	J4	Connect outside HD audio input	
7	J2	Connect outside SCART signal input	
10	J9	Connect inside DVD signal input	Not used
12	J7	Connect inside DVD K board	Not used
13	J12	Connect earphone output board	
14	J14	Connect speaker	
15	J13	Connect speaker	
16	J6	Connect TV K board	Look circuit diagram ，the second pin is 3.3V
17	J5	Connect remote control receiving board	Look circuit diagram，the fifth pin is 3.3V
18	J11	UOC debug socket	Not used
19	J10	DPF digital photo-frame signal input	Not used
20	J17	Connect display screen （TTL panel）	CMO 20” panel
21	J16	Connect display screen （LVDS panel）	Not used
22	J22	Connect display screen （TTL panel）	Not used
23	J15	MST518 debug socket	Not used
24	J19	Supply DVD or DPF power	Not used
25	J18	Connect inverter	+12V, +12V, backlight switch，GND, GND,GND

Description of Main component

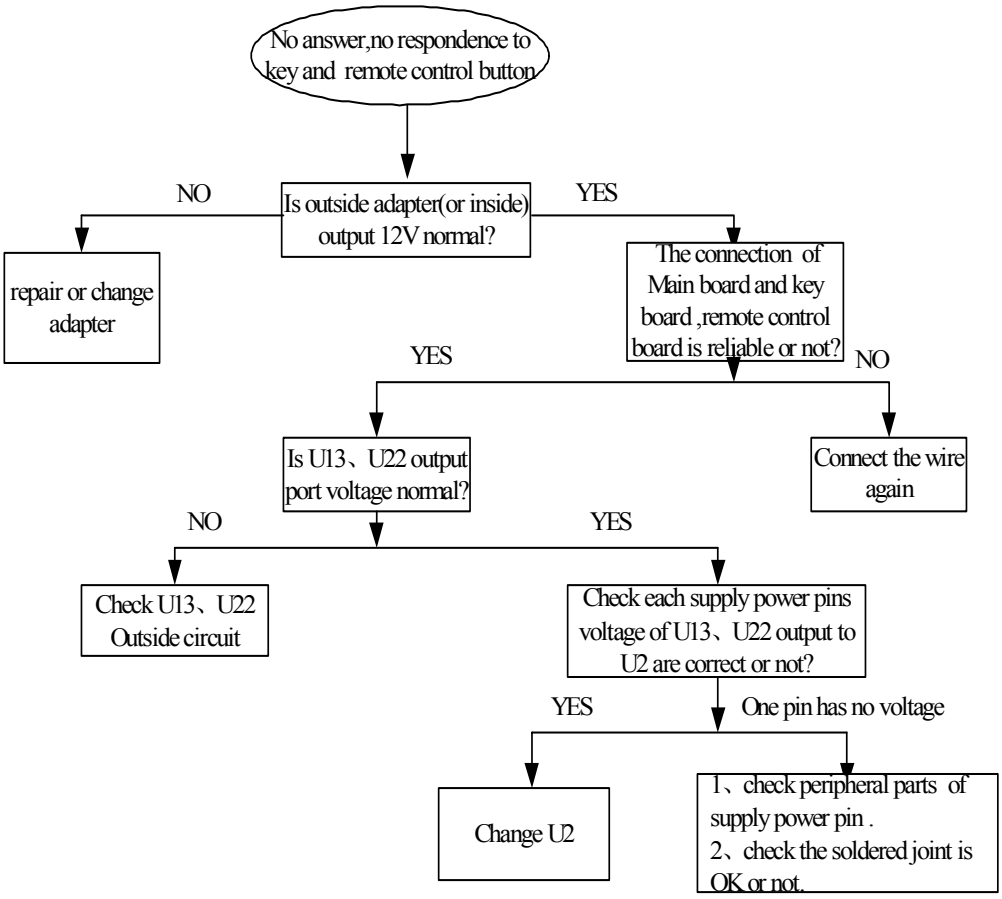
No.	**name**	element	**Function description**

A	A1	RF tuner TAF5-E2I21RW2	RF input, IF output
B	U2	UOC(TDA15021H)	Video decode and MCU control
C	U3	MST518	AD converter and format transformer
D	U20	PI5V330A	Video switch on/off
E	U6	PI5V330A	Video switch on/off
F	U11	IRF7316	MOS switch
G	U9	LM2596-5.0	Linear voltage IC
H	U23	LM2596-5.0	Linear voltage IC
I	U19	NTMS10P02	MOS switch
J	U21	TDA1517ATW	Audio power amplifier
K	U8	TDA1517ATW	Audio power amplifier
L	U4	24LC32A	EEPROM(store user control information)
M	Q9	Si2311DS	MOS switch
N	U12	IRF7316	MOS switch
O	U1	24LC21A	EEPROM(store display parameter information)

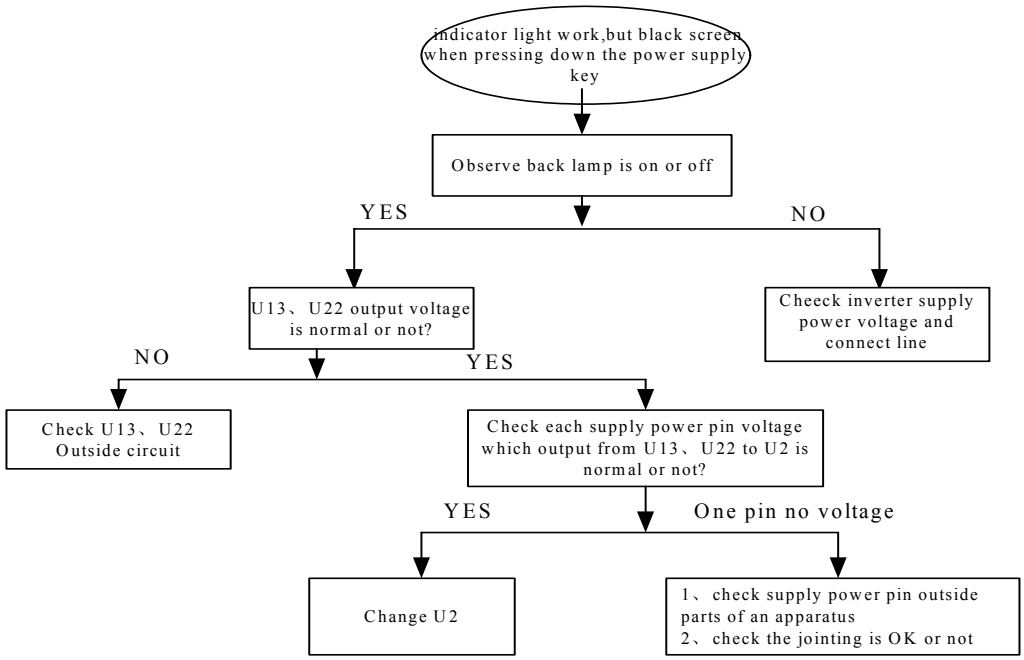
PartⅣ: Typical troubleshooting processing flowchart and Example

Ⅰ. Typical troubleshooting flowchart

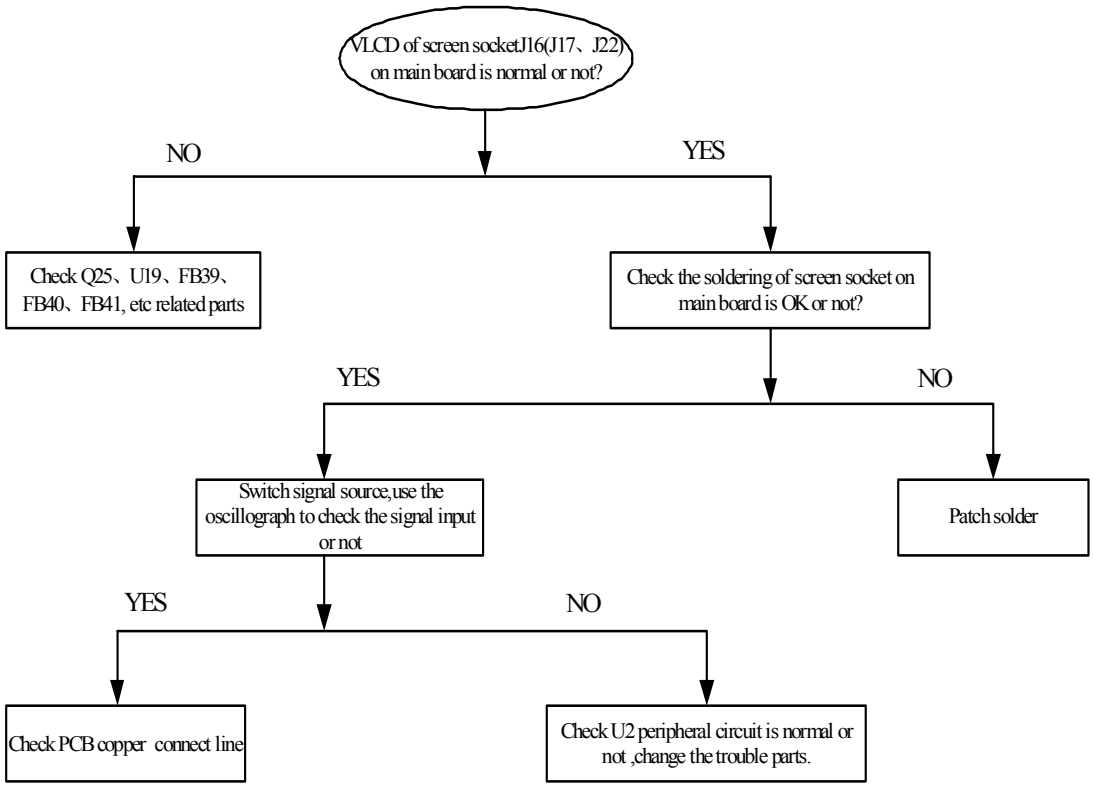
1、No anything(haven't sound ,haven't picture, haven't indicator light),and no respondence to key、remote control.


No answer,no respondence to key and remote control button
Is outside adapter(or inside) output 12V normal?
NO
YES
repair or change adapter
The connection of Main board and key board ,remote control board is reliable or not?
YES
NO
Is U13、U22 output port voltage normal?
Connect the wire again
NO
YES
Check U13、U22 Outside circuit
Check each supply power pins voltage of U13、U22 output to U2 are correct or not?
YES
One pin has no voltage
Change U2
1、check peripheral parts of supply power pin .
2、check the soldered joint is OK or not.

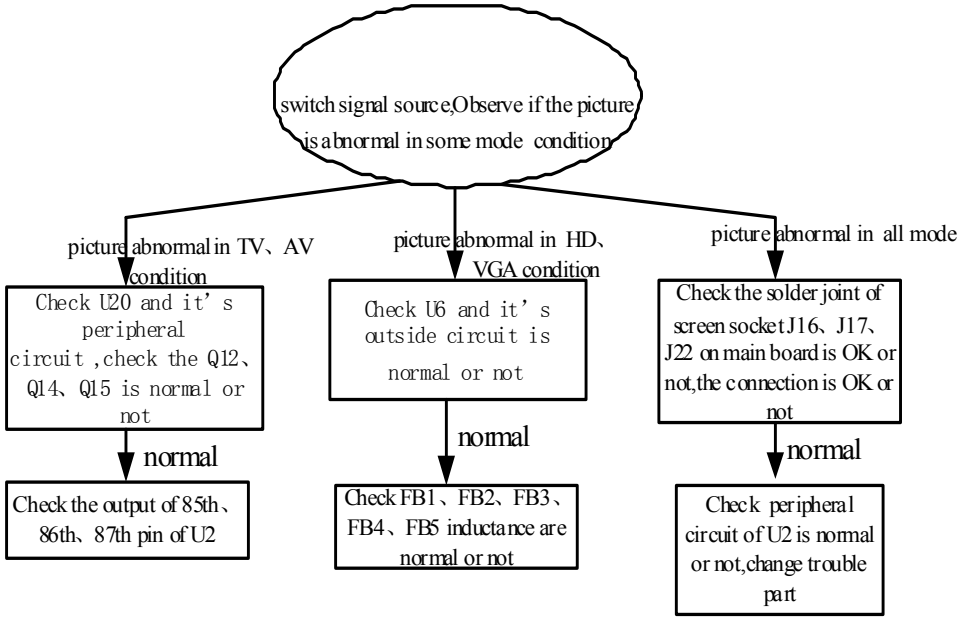
2、 Have sound no picture, indicator light work normally


indicator light work,but black screen when pressing down the power supply key
Observe back lamp is on or off
YES
NO
U13、U22 output voltage is normal or not?
Cheeck inverter supply power voltage and connect line
NO
YES
Check U13、U22 Outside circuit
Check each supply power pin voltage which output from U13、U22 to U2 is normal or not?
YES
One pin no voltage
Change U2
1、check supply power pin outside parts of an apparatus
2、check the jointing is OK or not

3、White screen: The reason of the troubleshoot is the signal electrode electrode haven't working voltage. The TFT is always in transparent condition, so the whole screen is in white raster.


VLCD of screen socketJ16(J17、J22) on main board is normal or not?
NO
YES
Check Q25、U19、FB39、FB40、FB41, etc related parts
Check the soldering of screen socket on main board is OK or not?
YES
NO
Switch signal source,use the oscillograph to check the signal input or not
Patch solder
YES
NO
Check PCB copper connect line
Check U2 peripheral circuit is normal or not ,change the trouble parts.

4、 Picture abnormal、color abnormal 、short of color


switch signal source,Observe if the picture is abnormal in some mode condition
picture abnormal in TV、AV condition
picture abnormal in HD、VGA condition
picture abnormal in all mode
Check U20 and it's peripheral circuit ,check the Q12、Q14、Q15 is normal or not
Check U6 and it's outside circuit is normal or not
Check the solder joint of screen socket J16、J17、J22 on main board is OK or not,the connection is OK or not
normal
normal
normal
Check the output of 85th、86th、87th pin of U2
Check FB1、FB2、FB3、FB4、FB5 inductance are normal or not
Check peripheral circuit of U2 is normal or not,change trouble part

II、 The example of service

Example 1: Can't turn on the TV

1、troubleshoot phenomenon: After connect power supply line and turn on the power supply ,no logo appear on screen. Press any key or use the remote control box, the TV has no reflection, no display and black screen.

The process of maintenance : Remove the plug of adapter output, measure adapter output voltage is +12V, the adapter works normally. check the connection with key board、remote control receiving board and mainboard. If they are ok, the problem must be MCU not work. First check supply power of U2 chip. Connect power supply, then measure the voltage of the 2、4 pin of U13 NTMS10P02 is 0.2V, and over-heat , the reason must be short circuit of power supply backend. You should remove the plug quickly, otherwise the chip must be bad. Use the multimeter to measure , confirm it is short circuit to ground. The places which connect U2 with 3.3V voltage are so many, you should disconnect and measure it one by one. when you disconnect the C68, it is normal, So it is caused by C68 Short circuit to grounding.

Example 2: No picture in VGA mode

2. Troubleshooting phenomenon: in TV/AV mode ,the image and sound is

ok, PC (in VGA mode) is no picture, but have state icon.
The process of maintenance: first check the signal source, signal socket、plug are ok or not. Because during switch the mode, the image display normally in non-PC mode ,it is proved that the backend image public processing channel is ok, namely U3 MST518 and backend image signal processing circuit work normally. In PC mode, measure the arbitrary pin of 4,7,12 pin , image data port of U6 P15V330A by oscillograph, there are no waveform, change U6P15V330A and the Troubleshooting phenomenon disappear.

Example 3: no picture in VGA mode and the "signal beyond boundary" is appeared on screen.

3. Troubleshooting phenomenon: no picture in VGA mode and the "signal beyond bound" is appeared on screen. in TV/AV mode, image、sound is ok. The process of maintenance: first check the signal output from the signal source is standard or not, or beyond the resolution which is supported by TFT panel. except of the two cases, the phenomenon comes from the TFT display. Under general circumstance it is caused by the abnormal of the horizon sync impulse ,vertical sync impulse of VGA signal. Inspect the 38th、39th pin of U3 by oscillograph, find the magnitude of horizon sync impulse is below the normal, measure the waveform of 13th pin of VGA J1 ,if it is ok, so maybe the value of resistor R23 will be largen, measure the resistance of R23 is 10K Ω, but the rating resistance is 1KΩ, so it is obvious that the magnitude of horizon sync. impulse is attenuated too much caused by value of couple resistance R23 become large. So the pixel clock inside of the MST518 can not vibrate, result in the A/D converter of MST518 internal can not work normally . So appear no picture in VGA mode and "signal beyond boundary" on TFT screen.

Example 4: Can control TV by remote control, but can not control TV by key board

4. Troubleshooting phenomenon: image、sound is ok under any source, use remote control to operate each function is ok, but can not control by using the key board, failure completely.
The process of maintenance: first check the socket of J6 on mainboard ,the solder joint and touch of connector are ok or not. if it is ok, check the key board ,measure each resistance, find R1 open circuit, change it .

Example 5: the image is ok after turn on the TV, but left speaker has no sound output

5. Troubleshooting phenomenon: the image is normal in TV mode, but the left speaker has no sound output, using remote control to

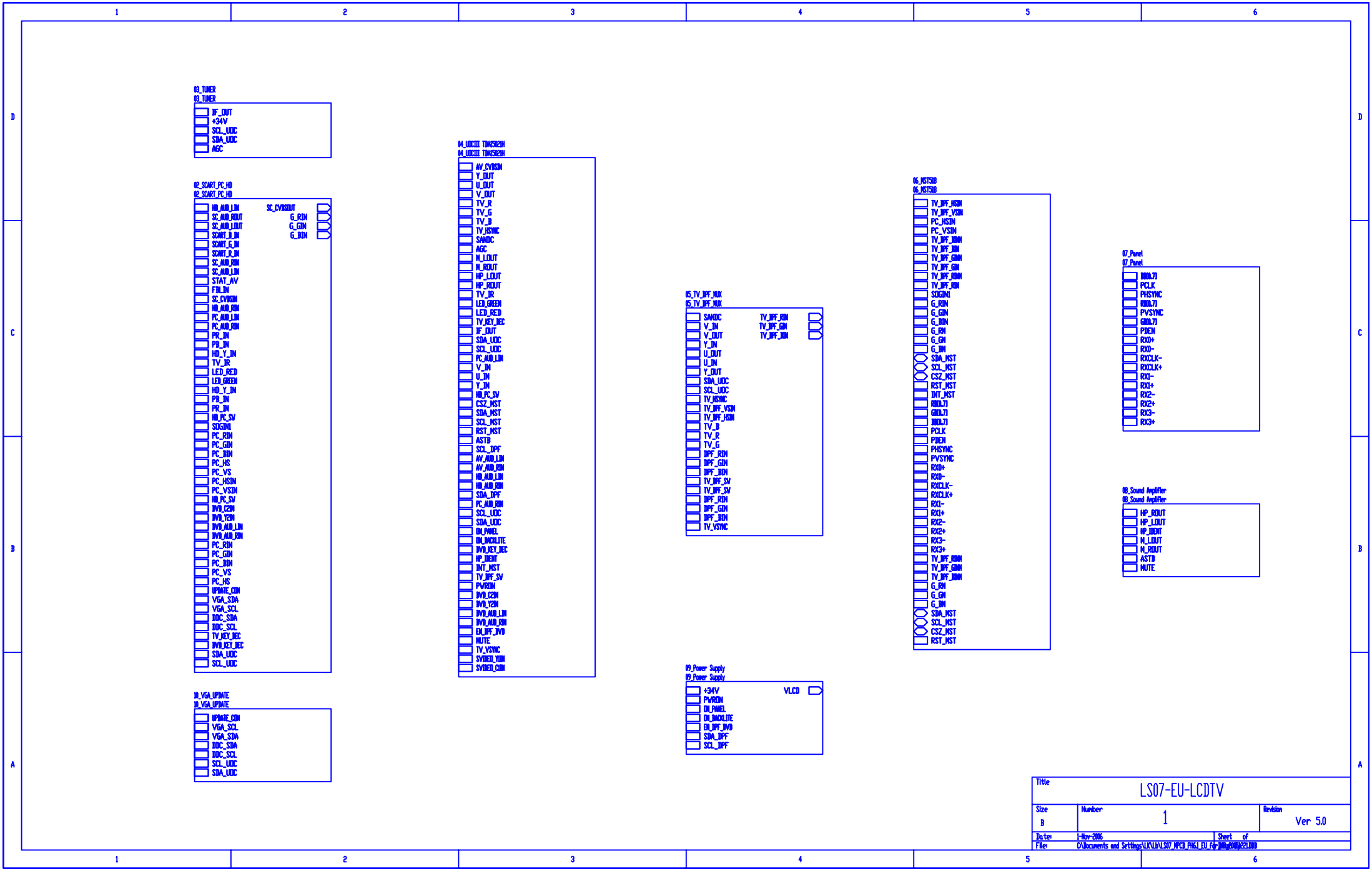
operate ,each function is ok. use AV、PC audio input ,is still no sound output.
The process of maintenance: measure the waveform from 60th pin of UOC by oscillograph, according to signal flowchat, measure R227、R157、U8、C130 one by one, and observe the waveform is ok or not, find the back end of C130 have not waveform, change C130 and troubleshooting disappear .

PartⅤ: Spare part lists

Spare part lists:

20 inch LCD TV

Material name	type (module NO.)	Material code	remark
Mainboard module	JUJ6.690.033	8669000330J	
Remote control receiving board module	JUJ6.694.016	8669400160J	
Key board module	JUJ6.694.015	8669400150J	
Earphone output board module	JUJ6.695.002	8669500020J	
TFT	V201V1-T03	50890010130	
INVERTER module	INV18-605D	59324106054	
Dynamoelectric speaker	Y38106-01-5W-4Ω	56231105043	
Remote control	KLC5A	8201803510L	
Inside Power supply module	FSP084-1CD02C	67128084025	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03_TUNER
IF_OUT
+34V
SCL_UOC
SDA_UOC
AGC
02_SCART_PC_HD
02_SCART_PC_HD
HD_AUD_LIN
SC_AUD_ROUT
SC_AUD_LOUT
SCART_B_IN
SCART_G_IN
SCART_R_IN
SC_AUD_RIN
SC_AUD_LIN
STAT_AV
FBL_IN
SC_CVBSIN
HD_AUD_RIN
PC_AUD_LIN
PC_AUD_RIN
PR_IN
PB_IN
HD_Y_IN
TV_IR
LED_RED
LED_GREEN
HD_Y_IN
PB_IN
PR_IN
HD_PC_SV
SOGIN1
PC_RIN
PC_GIN
PC_BIN
PC_HS
PC_VS
PC_HSIN
PC_VSIN
HD_PC_SV
DVB_C2IN
DVB_Y2IN
DVB_AUD_LIN
DVB_AUD_RIN
PC_RIN
PC_GIN
PC_BIN
PC_VS
PC_HS
UPDATE_COM
VGA_SDA
VGA_SCL
DDC_SDA
DDC_SCL
TV_KEY_REC
DVB_KEY_REC
SDA_UOC
SCL_UOC
SC_CVBSOUT
G_RIN
G_GIN
G_BIN
10_VGA_UPDATE
10_VGA_UPDATE
UPDATE_COM
VGA_SCL
VGA_SDA
DDC_SDA
DDC_SCL
SCL_UOC
SDA_UOC
04_UOC111 TM4SR2H
04_UOC111 TM4SR2H
AV_CVBSIN
Y_OUT
U_OUT
V_OUT
TV_R
TV_G
TV_B
TV_HSYNC
SANDC
AGC
M_LOUT
M_ROUT
HP_LOUT
HP_ROUT
TV_IR
LED_GREEN
LED_RED
TV_KEY_REC
IF_OUT
SDA_UOC
SCL_UOC
PC_AUD_LIN
V_IN
U_IN
Y_IN
HD_PC_SV
CSZ_MST
SDA_MST
SCL_MST
RST_MST
ASTB
SCL_DPF
AV_AUD_LIN
AV_AUD_RIN
HD_AUD_LIN
HD_AUD_RIN
SDA_DPF
PC_AUD_RIN
SCL_UOC
SDA_UOC
EN_PANEL
EN_BACKLITE
DVB_KEY_REC
HP_IDENT
INT_MST
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PWRDN
DVB_C2IN
DVB_Y2IN
DVB_AUD_LIN
DVB_AUD_RIN
EN_DPF_DVB
MUTE
TV_VSYNC
SVIDEO_YIN
SVIDEO_CIN
05_TV_DPF_MUX
05_TV_DPF_MUX
SANDC
V_IN
V_OUT
Y_IN
U_OUT
U_IN
Y_OUT
SDA_UOC
SCL_UOC
TV_HSYNC
TV_DPF_VSIN
TV_DPF_HSIN
TV_B
TV_R
TV_G
DPF_RIN
DPF_GIN
DPF_BIN
TV_DPF_SV
TV_DPF_SV
DPF_RIN
DPF_GIN
DPF_BIN
TV_VSYNC
TV_DPF_RIN
TV_DPF_GIN
TV_DPF_BIN
09_Power Supply
09_Power Supply
+34V
PWRDN
EN_PANEL
EN_BACKLITE
EN_DPF_DVB
SDA_DPF
SCL_DPF
VLCD
06_MST5B
06_MST5B
TV_DPF_HSIN
TV_DPF_VSIN
PC_HSIN
PC_VSIN
TV_DPF_RRIN
TV_DPF_RIN
TV_DPF_GRIN
TV_DPF_GIN
TV_DPF_BRIN
TV_DPF_BIN
SOGIN1
G_RIN
G_GIN
G_BIN
G_RN
G_GN
G_BN
SDA_MST
SCL_MST
CSZ_MST
RST_MST
INT_MST
RRIN_7I
GRIN_7I
BRIN_7I
PCLK
PDEN
PHSYNC
PVSYNC
RX0+
RX0-
RXCLK-
RXCLK+
RX1-
RX1+
RX2-
RX2+
RX3-
RX3+
TV_DPF_RRIN
TV_DPF_GRIN
TV_DPF_BRIN
G_RN
G_GN
G_BN
SDA_MST
SCL_MST
CSZ_MST
RST_MST
07_Panel
07_Panel
RRIN_7I
PCLK
PHSYNC
RRIN_7I
PVSYNC
GRIN_7I
PDEN
RX0+
RX0-
RXCLK-
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RX1-
RX1+
RX2-
RX2+
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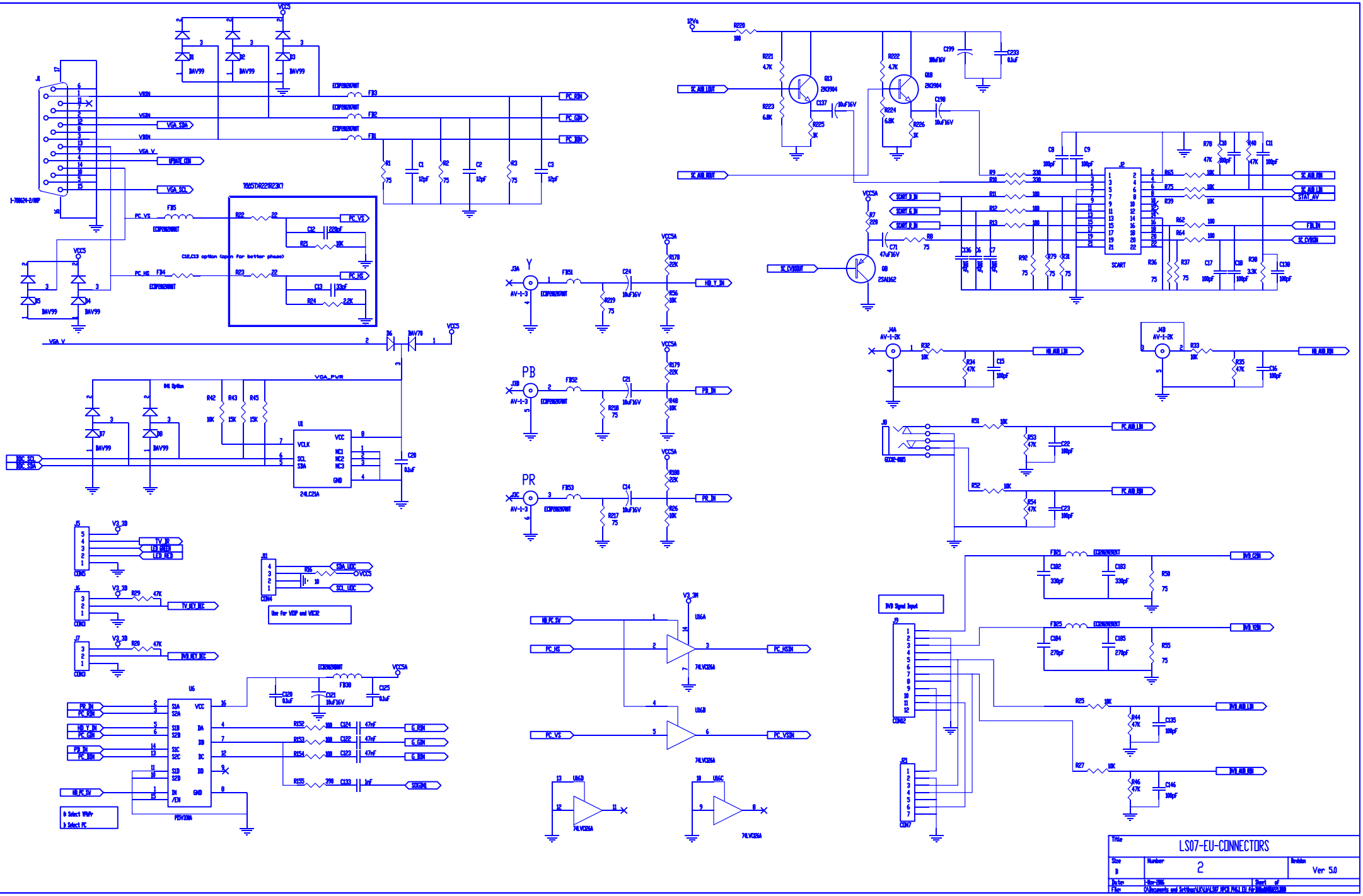
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PC_VS
PC_HS
PC_RIN
PC_GIN
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FB2
FB3
FB4
FB5
R1
R2
R3
C1
C2
C3
C12
C13
R21
R23
R24
D1
D2
D3
D4
D5
D6
D7
D8
BAV99
BAV70
VGA_PWR
R41 Option
R42
R43
R45
U1
24LC21A
SDC_SCL
SDC_SDA
C20
J5
TV_IR
LED_GREEN
LED_RED
J6
TV_KEY_REC
J7
DVD_KEY_REC
R29
J1
SDA_UOC
SCL_UOC
R35
Use for VDP and VEC2
U6
PSV339A
FB39
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C121
C125
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R153
R154
R155
C124
C122
C123
C133
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R_GIN
R_BIN
SYSCLK
HD_Y_IN
PB_IN
PR_IN
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J3B
J3C
FB51
FB52
FB53
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C21
C14
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R217
R178
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R48
R26
Y
PB
PR
J4A
J4B
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R33
R34
R35
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C16
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R53
R54
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C23
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PC_AUD_RIN
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R221
R222
R223
R224
R225
R226
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Q14
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C137
C198
C199
C233
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SC_AUD_ROUT
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SCART_R_IN
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R12
R13
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R37
R38
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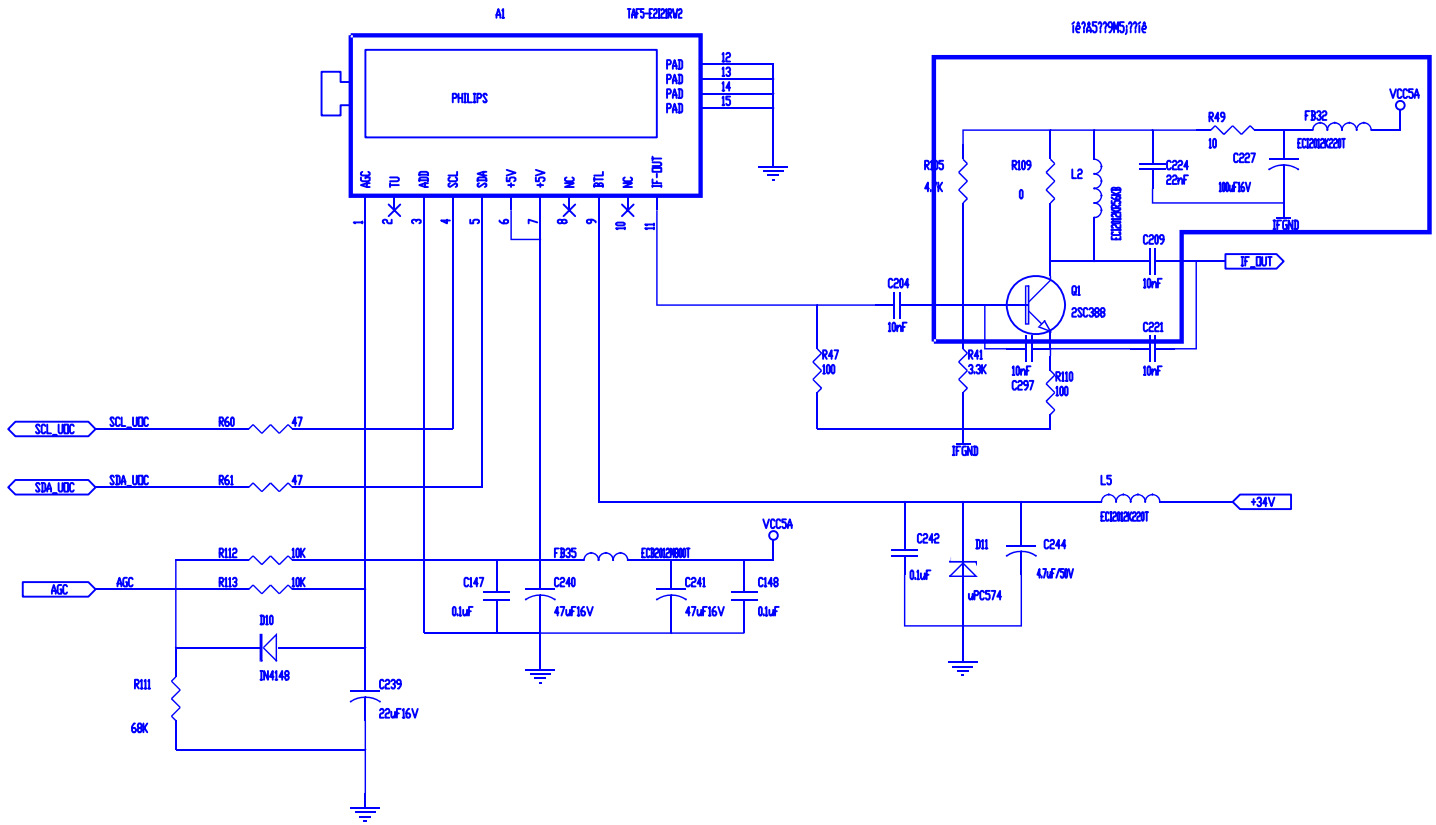
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R61
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R112
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R113
10K
D10
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FB35
C147
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C240
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C241
47uF16V
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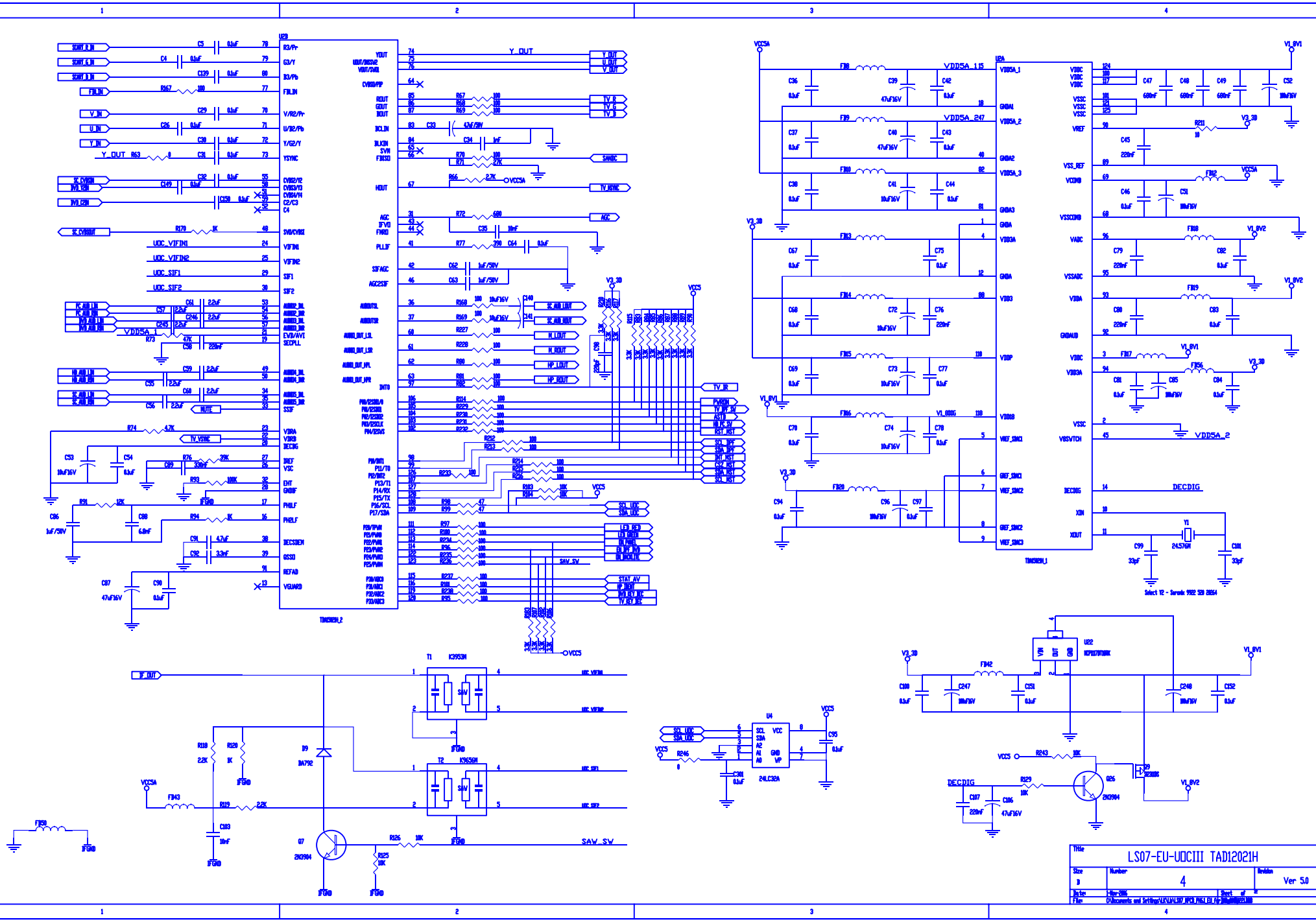
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U_OUT
V_OUT
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TV_B
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TV_HSYNC
AGC
TV_IR
SCL_UDC
SDA_UDC
LED_RED
LED_GREEN
BL_PWM
BL_INV_PWM
BL_ENABLE
STAT_AV
HP_DET
TV_KEY_DET
SAV_SV
SCL_HPF
SDA_HPF
INT_HST
SCL_HST
SDA_HST
RST_HST
SC_AUD_LOUT
SC_AUD_ROUT
M_LOUT
M_ROUT
HP_LOUT
HP_ROUT
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VDD5A_2.47
VDD5A_1
VDD5A_2
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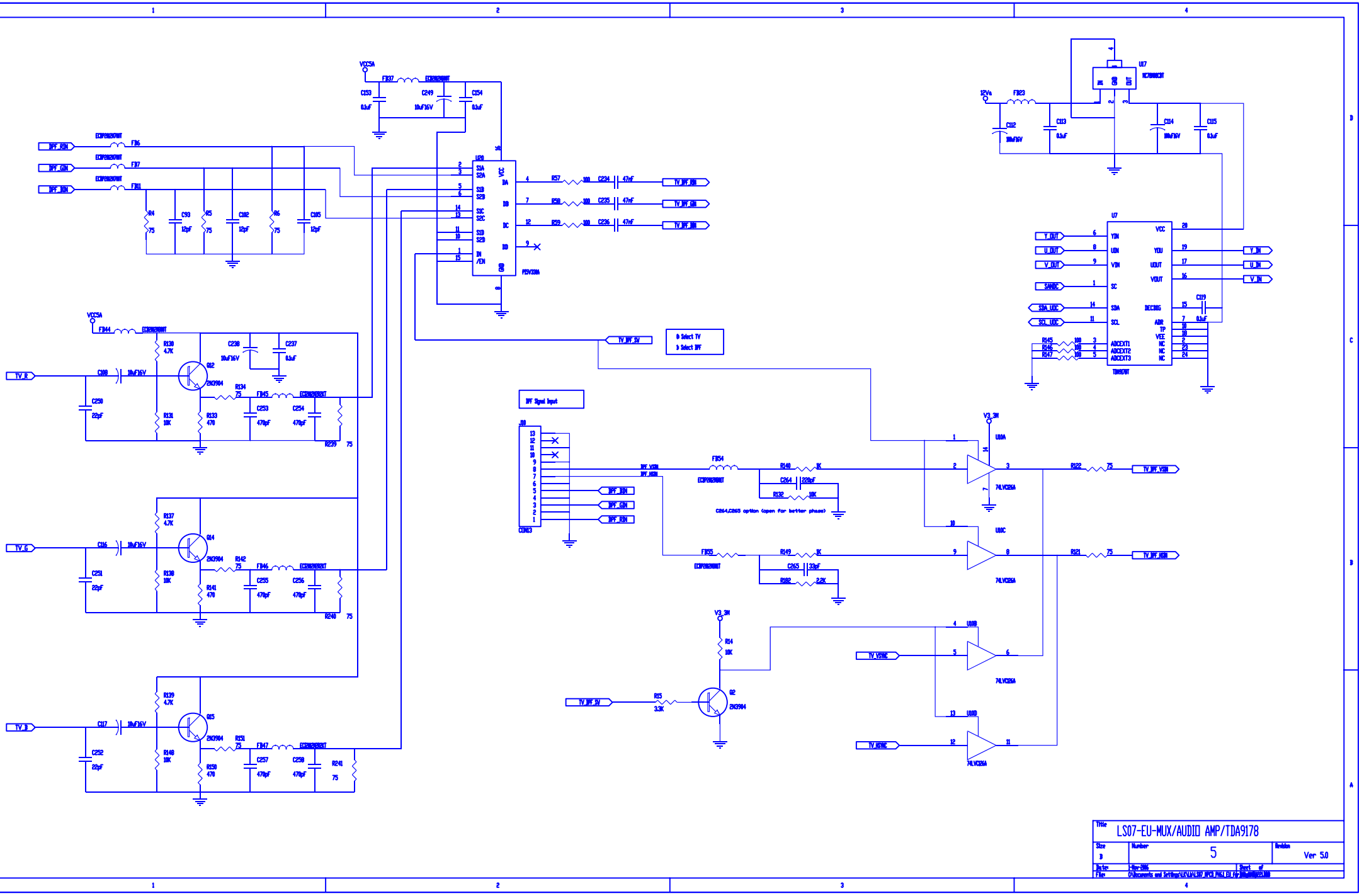
Select Y2 - Murata 9B2 SB 2B54



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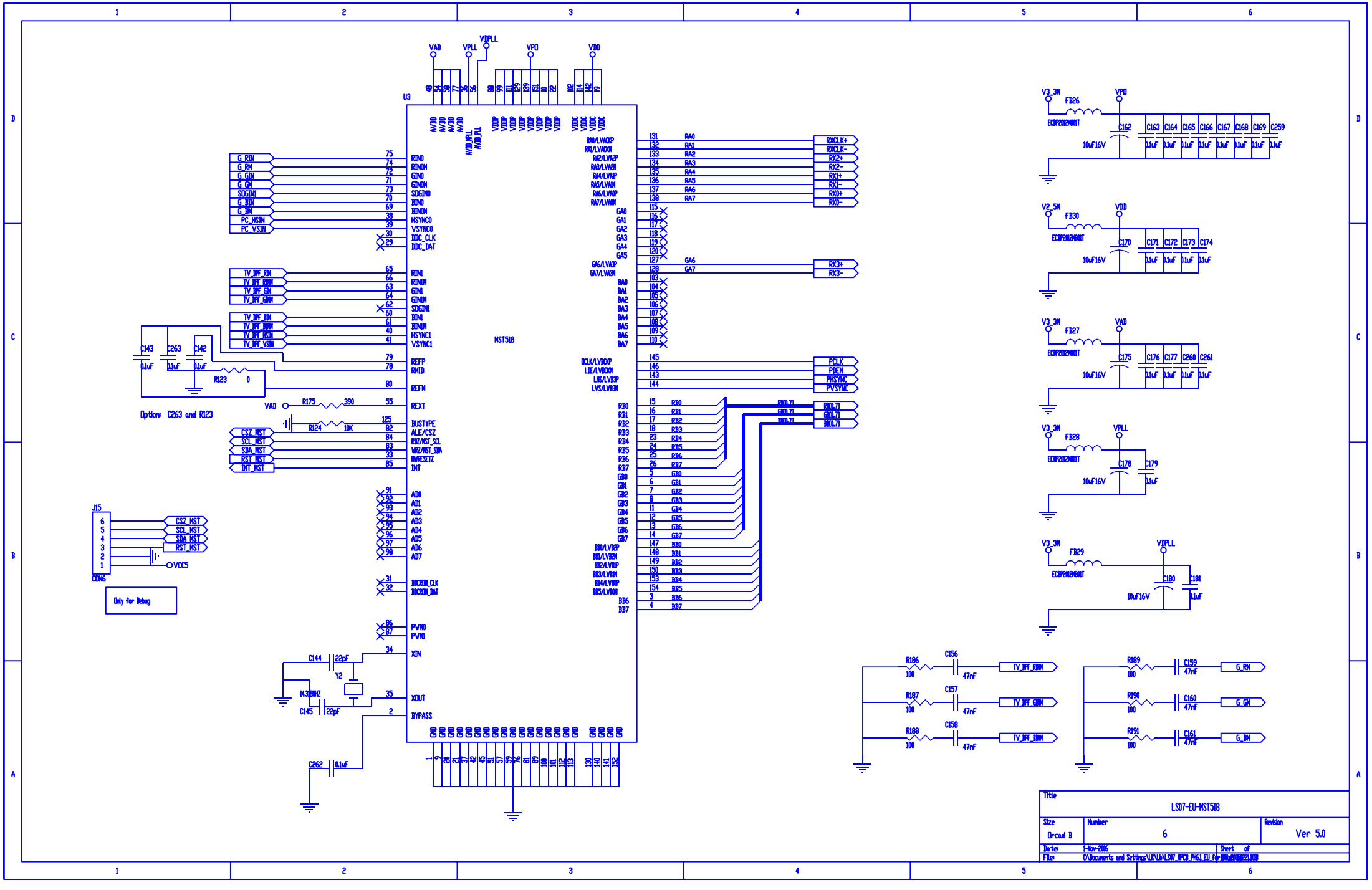
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TV_RFF_RINM
TV_RFF_GIN
TV_RFF_GINM
TV_RFF_BIN
TV_RFF_BINM
TV_RFF_HSIN
TV_RFF_VSIN
C143
C263
C142
R123
Option: C263 and R123
R175
390
R124
10K
CSZ_MST
SCL_MST
SDA_MST
RST_MST
INT_MST
J15
CON6
VCC5
Only for Debug
C144
22pF
Y2
14.318MHZ
C145
C262
0.1uF
RXCLK+
RXCLK-
RX2+
RX2-
RX1+
RX1-
RX0+
RX0-
RX3+
RX3-
PCLK
PDEN
PHSYNC
PVSYNC
R186
R187
R188
C156
C157
C158
47nF
100
R189
R190
R191
C159
C160
C161
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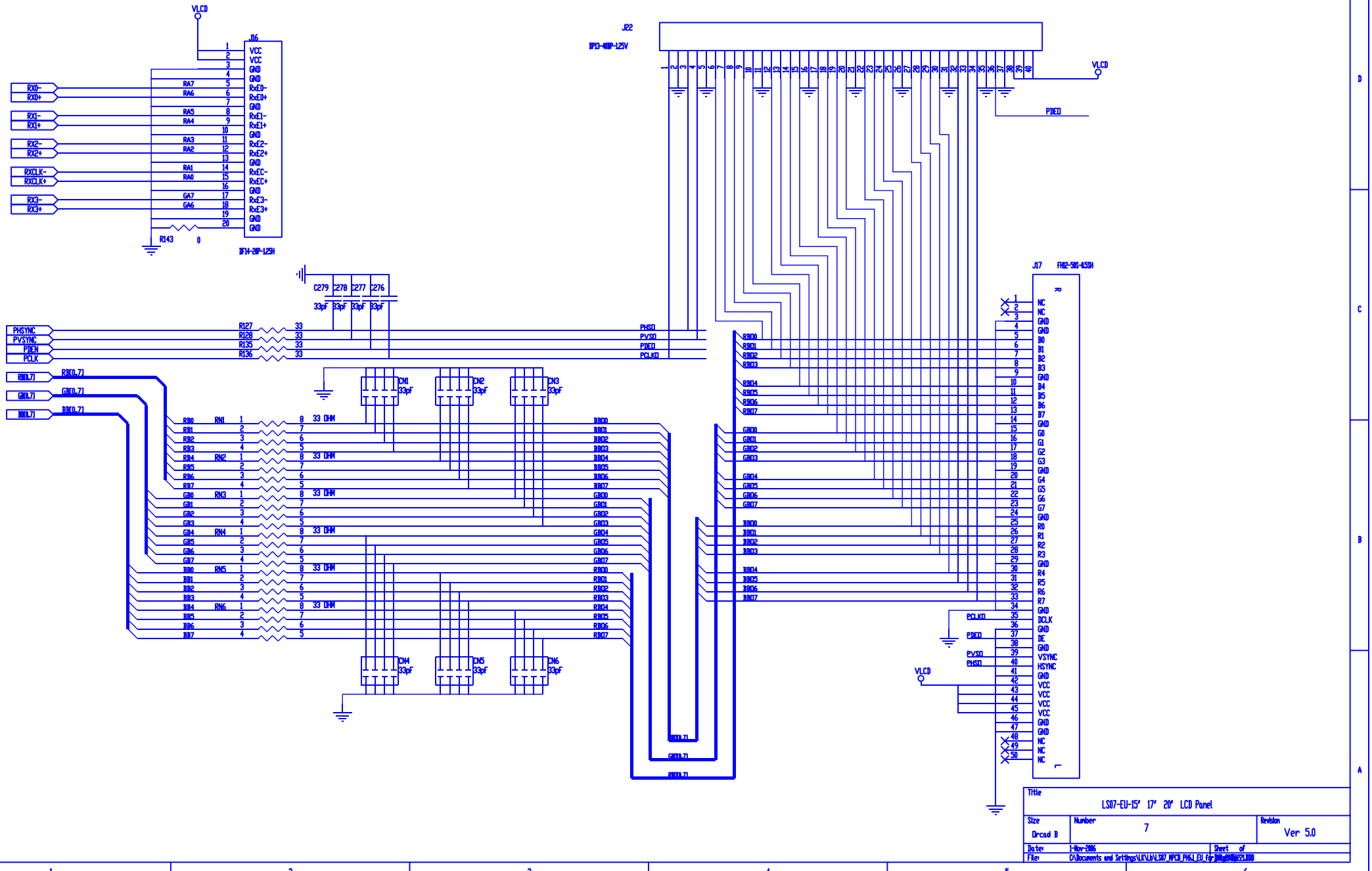
VLCD
J16
VCC
VCC
GND
GND
RxE0-
RxE0+
GND
RxE1-
RxE1+
GND
RxE2-
RxE2+
GND
RxEC-
RxEC+
GND
RxE3-
RxE3+
GND
GND
RX0-
RX0+
RX1-
RX1+
RX2-
RX2+
RXCLK-
RXCLK+
RX3-
RX3+
R143 0
IPI4-28P-1.25H
J22
IPI3-40P-1.25V
VLCD
PDEN
J17 FH12-50S-0.5SH
C279 C278 C277 C276
33pF 33pF 33pF 33pF
PHSYNC
PVSYNC
PDEN
PCLK
R127 R128 R135 R136 33
PHSO
PVSO
PDEO
PCLKO
R[0..7]
G[0..7]
B[0..7]
C1 C2 C3 C4 C5 C6 33pF
RN1 RN2 RN3 RN4 RN5 RN6 33 OHM
RB00 RB01 RB02 RB03 RB04 RB05 RB06 RB07
GB00 GB01 GB02 GB03 GB04 GB05 GB06 GB07
BB00 BB01 BB02 BB03 BB04 BB05 BB06 BB07
NC GND DCLK DE VSYNC HSYNC VCC
Title
LS07-EU-15" 17" 20" LCD Panel
Size
Dread B
Number
7
Revision
Ver 5.0
Date: 1-Nov-2006
Sheet of
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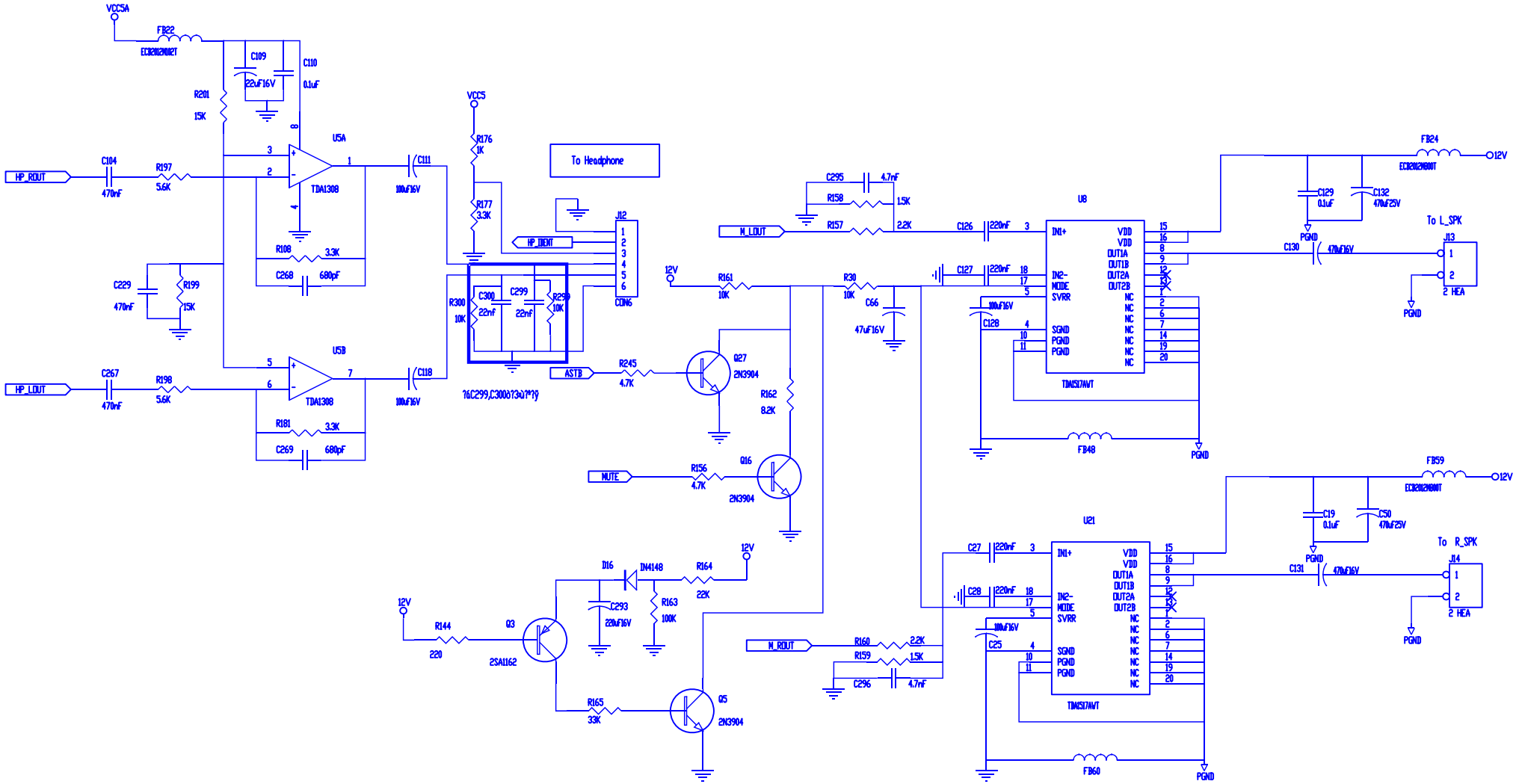

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Size: B	Number: 8	Revision: Ver 5.0
Date: 1-Nov-2006	Sheet of	
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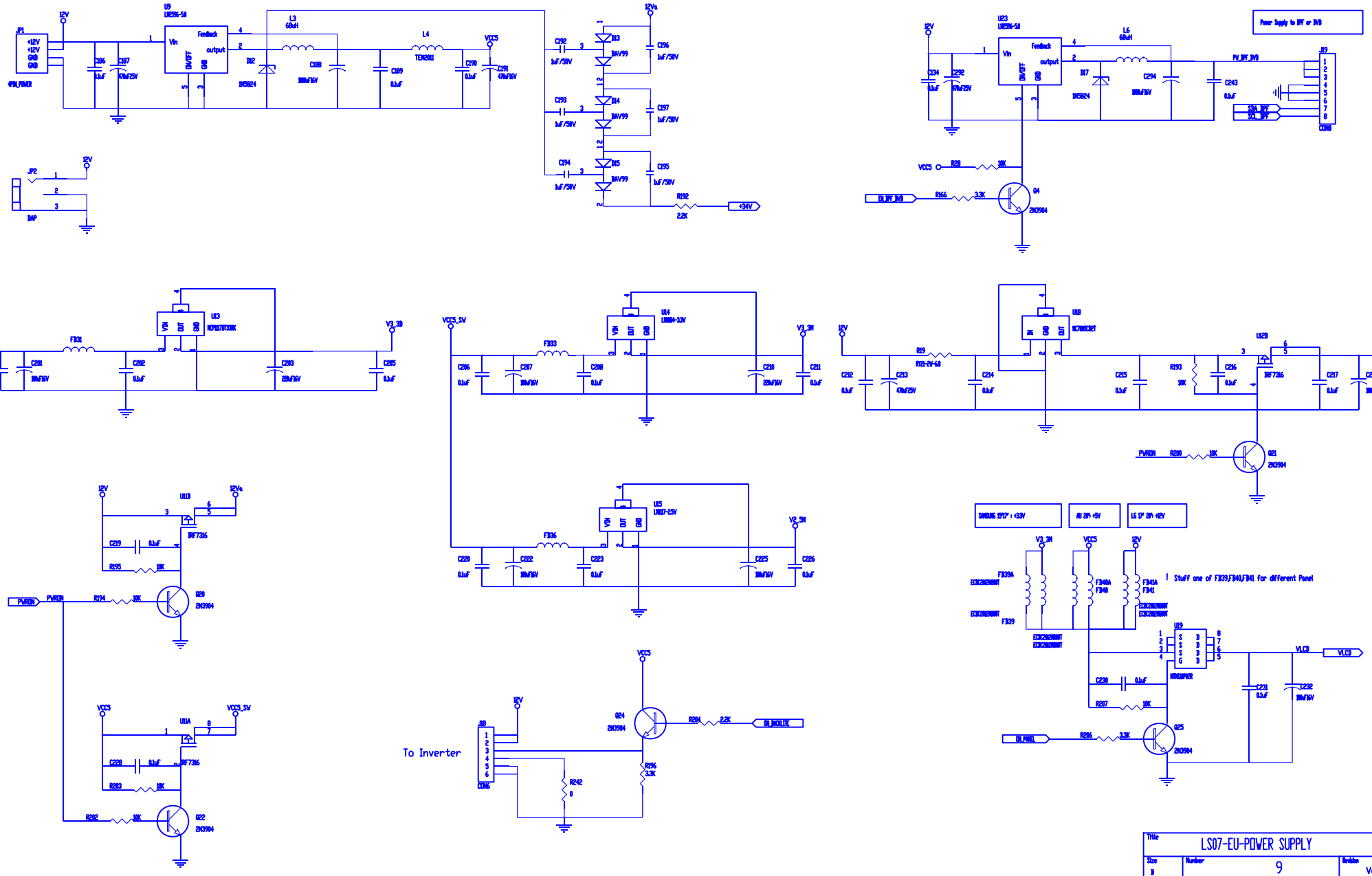
JP1
+12V
+12V
GND
GND
4PIN_POWER
12V
U9
LM2596-5.0
Feedback
output
Vin
ON/OFF
GND
L3
68uH
L4
TEN2011
VCC5
IN2
IN5824
C186
0.1uF
C187
470uF/25V
C188
100uF/16V
C189
0.1uF
C190
0.1uF
C191
470uF/16V
C192
1uF/50V
C193
1uF/50V
C194
1uF/50V
C196
1uF/50V
C197
1uF/50V
C195
1uF/50V
12Va
IN3
IN4
IN5
1N4V99
R192
2.2K
+34V
JP2
3
INP
U23
LM2596-5.0
L6
68uH
IN7
IN5824
C234
0.1uF
C292
470uF/25V
C294
100uF/16V
C243
0.1uF
PW_INV_3V3
J19
SDA_INV
SCL_INV
C2368
Power Supply to INV or 3V3
R29
10K
R166
3.3K
Q4
2N3904
EN_INV_3V3
U3
MCP1827S33X
VCC5
V3_3D
FB31
C200
0.1uF
C201
100uF/16V
C202
0.1uF
C203
220uF/16V
C205
0.1uF
U4
LM804-3.3V
VCC5_5V
V3_3M
FB33
C206
0.1uF
C207
100uF/16V
C208
0.1uF
C210
220uF/16V
C211
0.1uF
U8
MCP6002E
R29
R22-5V-68
C212
0.1uF
C213
470uF/25V
C214
0.1uF
U12B
IRF7306
C215
0.1uF
R193
10K
C216
0.1uF
C217
0.1uF
C218
100uF/16V
VCC5A
PWRON
R200
10K
Q21
2N3904
U11B
IRF7306
C219
0.1uF
R195
10K
R194
10K
Q20
2N3904
U5
LM317-2.5V
V2_5M
FB36
C220
0.1uF
C222
100uF/16V
C223
0.1uF
C225
100uF/16V
C226
0.1uF
SAMSUNG 15"17" : +3.3V
AU 19" : +5V
LG 17" 19" : +12V
V3_3M
VCC5
12V
FB39A
FB39
FB40A
FB40
FB41A
FB41
EC3C2R2000NT
U19
MINISMPDR
VLCD
C230
0.1uF
C231
0.1uF
C232
100uF/16V
R297
10K
R296
3.3K
Q25
2N3904
EN_PANEL
I Stuff one of FB39/FB40/FB41 for different Panel
U11A
IRF7306
C228
0.1uF
R283
10K
R282
10K
Q22
2N3904
VCC5
VCC5_5V
To Inverter
J18
CON6
R242
0
Q24
2N3904
R284
2.2K
R296
3.3K
EN_BACKLITE
Title
LS07-EU-POWER SUPPLY
Size
B
Number
9
Revision
Ver 5.0
Date:
Mar-2006
Sheet of
File:
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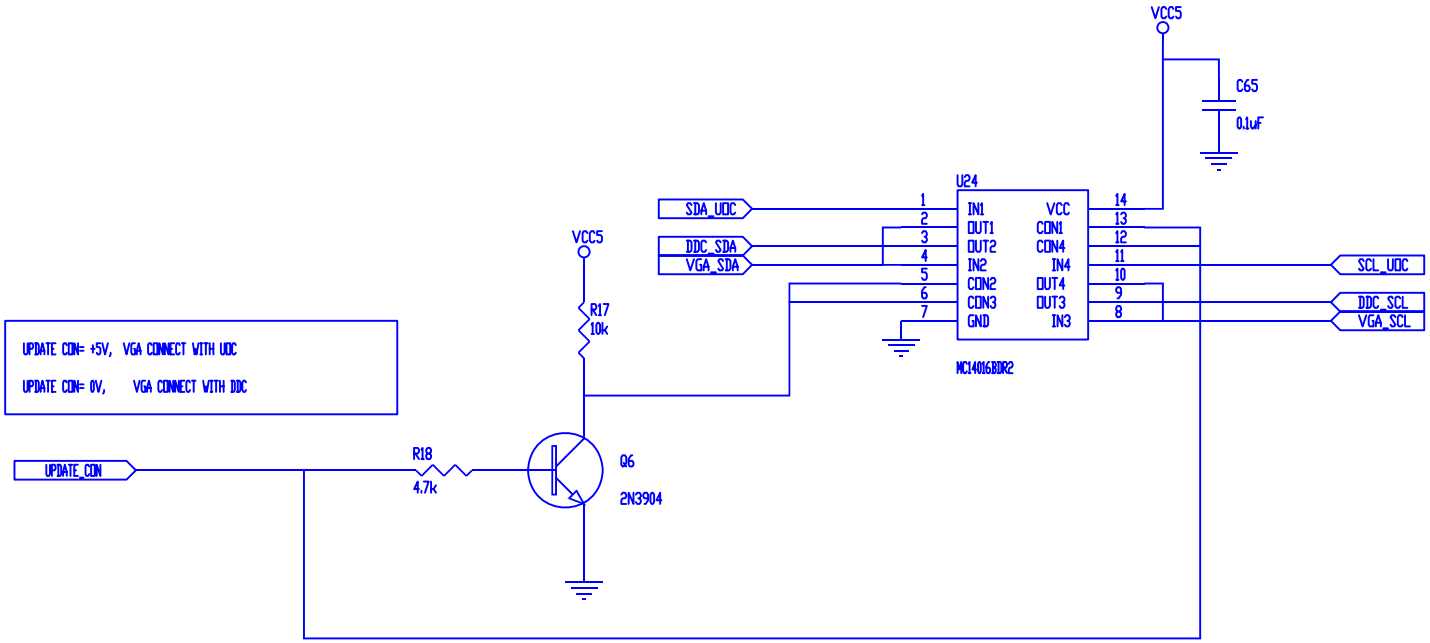
1
2
3
4
A
B
C
D



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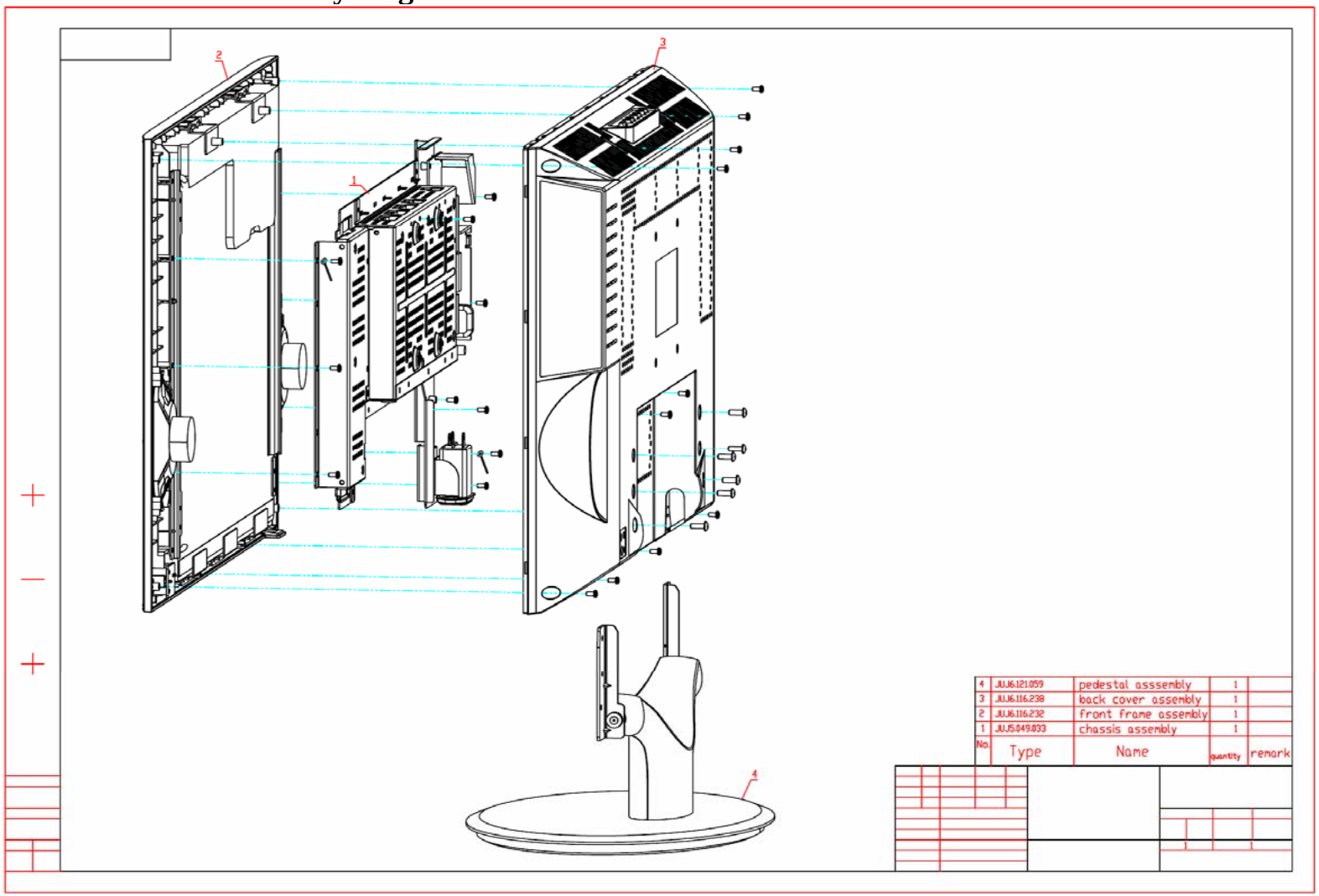
Annex 3 Final Assembly diagram



Annex 4 Final Wire Connection diagram